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## ORIGINAL COMMUNICATIONS.

### CONCERNING THE TREATMENT OF VARIOUS FORMS OF OCULAR SYPHILIS WITH SALVARSAN—A CLINICAL LECTURE DELIVERED IN THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.


BY G. E. DE SCHWEINITZ, M.D.,
Professor of Ophthalmology.


The happy results of the treatment of constitutional syphilis with salvarsan, ordinarily known as "606," are well known to you, but it is proper that you should witness the effects of this remedy on syphilitic lesions of the eye, and therefore I shall devote a portion of this hour to a consideration of this agent under these circumstances. While Dr. Laird is preparing his fluids (and he will presently give one of the patients an intravenous injection of salvarsan) I shall call your attention to the clinical history of the patients here presented.

*Case 1.—Bilateral parenchymatous keratitis of syphilitic origin; result of salvarsan treatment.* The case history of this patient, a man aged thirty-two, is as follows: The patient's father died at the age of fifty years as the result of a hemorrhage produced by coughing. For two years prior to his death he had been in poor health. The patient's mother, aged seventy-three, is still living. Ten years ago she broke her arm, and eight months later gangrene set in and the arm was amputated. One year later gangrene developed in one foot, and this member was also amputated. One year ago gangrene appeared in the other foot, and again amputation was required. The patient had eleven brothers, but only two are living, and these are in good health—one, however, is slightly deaf. All those who died perished before they were seven years of age. One sister is living and in good health. The patient is married, and his wife, ordinarily in good health, has been ill during the present spring with rheumatism. He has four children; all are living and in good health. His wife has not had any miscarriages.

The patient's own health has been singularly good; in point of fact, he never has had any serious illness. He denies syphilis, but acknowledged urethritis twelve or thirteen years ago. About one and one-half years ago the right cornea was injured, and there is now a curved scar extending from the inner end of the right eyebrow along the side of the nose 1½ inches in length. During July of the present year a hot cinder flew into the left eye, and subsequently he thinks he "caught cold," as he expresses it. Prior to that time this eye had been weak, and he reports that an ocular examination which he underwent indicated that his vision, even with a glass, was only one-half of normal. Since the cinder accident the eye has gradually become more inflamed, but he has suffered little pain, and within the past two weeks the vision of the other or right eye has grown defective, and the eye, to use his own expression, has become quite misty. When he reported for examination he was then examined by my associate, Dr. Thomas B. Holloway.

Vision of the right eye was 5/30; there was slight ciliary injection and a large quadrant of the cornea was steamy and hazy, and through it radiated a number of lines of infiltration which probably repre-

sented foldings in Descemet's membrane. At the corneal periphery above there was a dusky-red marginal vascularization. The pupil was 4 mm. in diameter and reacted only moderately to light. There was no rise of tension, but the cornea was too steamy to permit ophthalmoscopic examination of the fundus. The vision of the left eye was hand movements at ½ meter. The entire cornea was steamy and needle-stuck, while a few saturated dots in the deeper layers were visible, and numerous broad striæ, radiating all through the parenchyma of the cornea, were easily detected. Above and below there was marked vascularization of the corneal margins, both deep and superficial in character, associated with a decided general ciliary injection. A mydriatic dilated the right pupil with freedom, but had little or no effect on the left pupil.

The Wassermann test was strongly positive. He was sent to the hospital, and an intravenous injection of 0.6 gramme of salvarsan was administered by Dr. Laird. After waiting for forty-eight hours, during which period of time the patient was somewhat nauseated, mercurial inunctions, 1 drachm daily, were systematically employed; locally hot compresses, 5-per-cent solution of dionin, and atropin to maintain mydriasis. At the expiration of three weeks the vision of the left eye—that is, of the eye which when he first reported for examination showed the greater involvement—had distinctly improved, the limbus vascularizations had practically disappeared, and only a slight pericorneal flush was demonstrable. The cornea was still slightly steamy, and a few saturated dots were visible in its parenchyma. The iris could be well studied, but regained its normal color, and the pupil was reasonably dilated. Uncorrected vision was 4/60.

In the meantime the right eye, however, in spite of this treatment, had failed to improve—indeed, it had grown decidedly worse, with increase of the vascularization, elaboration of the haziness of the cornea and a greater development of the striæ of infiltration through its parenchyma, and the deposition of flocculent opacities in its stroma. Vision was reduced to counting fingers at 8 inches. The mercurial treatment was continued, together with the local applications already described. The Wassermann test is still positive, and Dr. Laird, who is now ready, will give an additional intravenous injection of 0.6 gramme of salvarsan. (This injection was given.[1])

Before proceeding to the remarks which I desire to make concerning these patients, I shall demonstrate another syphilitic corneal lesion, as follows:

*Case 2.—Double parenchymatous keratitis the result of inherited syphilis; result of salvarsan treatment.* The case history of this patient, an unmarried man aged twenty-one, is as follows: Concerning his family history I have no data. The patient denies syphilitic infection. Except that he has worn glasses since he was fourteen years old, and the left eye has always been weak and watery, he knows of no ocular trouble until his present difficulties began—that is to say, in July of 1910, when the right eye became inflamed, and two months later the left eye was involved. He was referred by his family physician, Dr. Mendenhall, to an oculist, who correctly diagnosticated the disease to be of syphilitic origin and treated him vigorously with mercurials and iodides, but with little benefit. At the time I first examined him, on the 29th of December, 1910, the vision of each eye was the ability to distinguish hand movements at 1 meter. On the right eye there was a large patch of vascularization occupying the center and middle upper third of the cornea. Beneath the vascular area in the deeper layers of the parenchyma of the cornea were a number of deeper deposits joined together by radiating lines, which were situated in the corneal stroma, and above these were a few superficial infiltrates. The corneal epithelium was edematous and extremely hazy. There was well-marked cyclitis. Precisely the same condition of affairs, if anything more marked, was present in the left cornea. The

[1] There was absolutely no reaction after the injection. Improvement of the right eye began within twenty-four hours after the salvarsan had been administered, and within a week an astonishing improvement occurred, the vascularization, haziness of the cornea, etc., quickly subsiding. The patient continued at intervals the mercurial inunctions, and at times iodide of potassium and bichloride of mercury, and left the hospital thirty days after the second salvarsan injection with both corneas practically clear, and uncorrected vision 6/12 in each eye.

patient was admitted to the University Hospital; a Wassermann test was made, as was also a Von Pirquet test. The former was actively positive, the latter negative. In addition to the corneal lesions, there are other stigmata suggesting inherited syphilis, to wit, the notched central incisors of Hutchinson, a somewhat dish-shaped appearance of the face, and a few rhagades at the angle of the mouth; there are no nodes on the tibia, but there is some enlargement of the postcervical glands.

On the date of his entrance into the hospital, the vision of each eye was the ability to detect the movements of the hand. From the 29th of December, 1910, until the 17th of May, 1911, five injections of salvarsan, four intravenous and one intramuscular, were given at my request by Drs. Siter and Uhle, as follows: January 18, 1911; February 12, 1911; March 8, 1911; March 30, 1911; and May 14, 1911. During the intervals between the injections large doses of iodide of potassium, from 60 to 100 grains per diem, were administered. Locally, atropine, dionin, and hot compresses were employed.

At first there was little or no improvement, but after the second salvarsan injection, and each one of these injections consisted of 0.6 gramme, there was decided improvement, evidenced in the subsidence of the corneal lesions and the cyclitis. By March 18th the vision of the right eye was 6/22 and of the left eye 6/30. Improvement from that date was rapid, and the corneal lesions markedly disappeared. A paresis of the external rectus of the left eye which had been evident on his arrival now became annoying, because he had sufficient sight to recognize the double images. On the day of his discharge the eyes were perfectly white and quiet, the central parenchymatous lesions were still evidenced in the haziness of the cornea, but this was the only remnant of the severe ocular inflammation from which he had suffered, and vision of the right eye was 6/12 and of the left eye 6/15. The patient returned to his home, and remained under the care of his physician, taking from time to time iodide and bichloride.

He returned a week ago, and I show him to you to-day practically a cured man, the vision of each eye being 6/12. A Wassermann test is doubtfully positive, and for safety's sake he is to have an additional injection of salvarsan.

*Case 3.—Double parenchymatous keratitis in a child the result of inherited syphilis; effect of salvarsan.* The case history of this patient, a girl aged seven, can only be briefly given because of inability to interview those from whom information could be obtained. The child had been neglected, probably cruelly treated, and whether any remedies had been applied for the relief of her corneal lesions is not known. When admitted she had an intense bilateral parenchymatous keratitis, with photophobia so great that it was with difficulty an examination was made. This revealed in equal severity in each eye intense ciliary congestion, a diffuse, thick interstitial deposit throughout the corneas, with numerous blood-vessels thickly set in the layers of the cornea, the vascularity being especially noteworthy in the upper portions of the cornea, and the limbus on each side being very red and swollen. Not only was the Wassermann reaction actively positive, but other physical defects indicated the presence of syphilis, namely, a somewhat dwarfed stature, a rather coarse flabby skin, a sunken nasal bridge, and vertical notching of the central incisors—in other words, the so-called Hutchinson's teeth. The child, however, is unusually intelligent, and in spite of her afflictions has a very happy disposition. Hot compresses, dionin, and atropine were used locally, and four injections of 2 decigrammes of salvarsan were given. The first of these was not very successful, owing to the smallness of the child's veins and the difficulty of introducing the fluid, so that in all probability any influence that it may have had is so trifling that it need not be counted. Three of the injections, however, all intravenous, were most satisfactory and were given at intervals of about four weeks. In each instance the child for a day and a night was greatly depressed, was nauseated, and had a slight rise of temperature, which, however, never

exceeded 100° F. Almost immediately photophobia subsided, with marked reduction in the activity of the ciliary congestion and the general vascularization of the corneas. Within three weeks the child was able to open its eyes readily and walk around the ward, could recognize colors and the outstretched hands, the previous vision, however, having been only light perception. The child continued under observation for about four months, during which period mercurials were given. A slow improvement was evident, although at the time of her discharge from the hospital (and she is now comfortably placed in a school for the instruction of the blind) there had never been sufficient clearing of the cornea to enable the patient to have letter vision, and yet, considering the character of the lesion on her entrance and the density of the deposits and the high grade of the vascularization, the improvement was most notable.

Let me now call your attention to two cases of *acquired ocular syphilis*, the patients having submitted to salvarsan treatment in an acute stage of the process.

A man, aged thirty-seven, three days prior to his admission to the hospital noted, together with sharp pain, an inflammation of the right eye. Examination at that time demonstrated a vision of 6/9, with typical ciliary congestion, muddiness of the iris, and one large and two smaller reddish-yellow nodules at the inner pupilary border, the iris beneath being attached by a synechial band to the capsule of the lens. This patient, therefore, had the so-called true syphilitic iritis, often termed iritis papulosa, in which the papular iris syphilides appear in the situation which I have described, and the remnants of which are but faintly visible now, or sometimes at the ciliary border, very rarely in the mid-breadth of the iris. The patient gave a clear history of primary infection six months prior to the ocular involvement, and of treatment which lasted only a short time—that is, until the disappearance of the first cutaneous syphilitic rash. Urine and blood examinations were normal, and the patient was given 0.6 gramme of salvarsan and suffered no inconvenience from the injection. Within twenty-four hours there was marked improvement, which in another twenty-four hours was a little less manifest, as the eye appeared slightly more flushed, although not as much flushed as it had been primarily. Forty grains daily of iodide of potassium were now administered, and eight days after the first injection of salvarsan a second intravenous injection of 0.6 gramme was administered. The improvement was so rapid after this second injection that at the expiration of nine days the iris had assumed practically a normal appearance, the only remnant of the very considerable mass of papular syphilides which had been present when the patient was first seen being a slight irregularity of the iris border at the point of their original situation. Vision is entirely normal. The patient is now taking iodide of potassium and mercuric bichloride and has been ordered to report from time to time. As you see, the eye is practically free from all of its former disabilities.

An even more surprising elimination of syphilitic lesions from the iris occurred in one of my patients, whom I cannot here demonstrate, who appeared in the early portion of last July with a single papular syphilide of the right iris. This patient's primary infection had occurred eleven months prior to the development of the iritis. He had submitted to most active mercurial medication, and had also taken sodium cacodylate. In spite of this, the iritis which I describe to you developed, and the Wassermann reaction was active. At my request an injection of 0.6 gramme of salvarsan was given to him by Dr. Uhle. Within forty-eight hours improvement was manifest; at the expiration of nine days the pupil was slightly flattened up and out at the original position of the syphilide, which could hardly be detected, and within a period of considerably less than a month, even with careful loup examination, hardly a trace of the original difficulty could be found, vision in each eye being 6/4.

Naturally, you will inquire whether this rather free use of salvarsan in full dose has been followed by any untoward symptoms or unpleasant reactions. As you know,

during the earlier days of the use of this remedy many violent reactions were noted and have been recorded: for example, a sharp rise of temperature, nausea, vomiting, diarrhea, intense headache, albuminuria, even active nephritis, herpes, and in certain parasyphilitic conditions, for example, tabes, violent pains of a lightning-like character. Naturally, these reactions were attributed to the toxicity of the drug, especially as some of the symptoms resembled those produced by arsenical poisoning. Owing largely to a discovery of Wechselmann's, it has been found that if the water used in the preparation of the saline solution, just as you have seen Dr. Laird prepare it, is not only sterilized but also distilled, these reactions are practically eliminated, and this has been well described in a recent communication on this subject by Dr. Homer F. Swift and Dr. Arthur W. M. Ellis, working in the Rockefeller Institute for Medical Research in New York. It is probable that unfavorable reactions occur when the water contains bacterial elements. Wechselmann, as quoted by Swift and Ellis, thinks that saprophytic microörganisms develop in distilled water which has stood for some time, that a certain amount of proteid matter is dissolved from these into the water which passes through the filter, and when injected in the circulation gives rise to the febrile reaction.

In the present series of cases no reactions of any moment occurred, with the single exception of some nausea and vomiting, save only that one of the patients after his first injection for some hours was in a state of exhilaration, almost like that of an intoxicated person, singing and laughing and saying foolish things. The temperature charts do not record any rise of temperature except twice in the case of the second and third patients, who exhibited on the evening of the day of the injection on one occasion a temperature of 100°, and on another a temperature of 100 2/5°. It would therefore seem to be important, whether the salvarsan is given in full dose (0.6 gramme) or in smaller doses frequently repeated, that freshly distilled water should be utilized for the preparation of the salvarsan and the normal saline. If salvarsan is given in repeated doses, in the opinion of many authorities, the dose should not exceed in men 0.5 gramme and in women 0.4 gramme, in order to lessen the danger of toxicity. In children the dose should be smaller.

You may inquire whether this drug has any deleterious influence upon vision, such, for example, as atoxyl has, which, as you know, in many instances has produced great disturbances of sight from optic nerve atrophy with primary involvement of the retina. Both from the clinical standpoint, as well as from that which is reached by experimental work, it may be stated in general terms that arsenobenzol has no ill effect upon the healthy optic nerve apparatus. Igersheimer failed to produce with repeated injections of Ehrlich's remedy any toxic symptoms, ophthalmoscopic changes, or microscopic lesions in rabbits, although in cats he succeeded, after the establishment of a subacute intoxication, in demonstrating degenerative changes in the ganglion cells of the retina and slight changes in the optic nerve. In general terms it is considered wise not to administer salvarsan in simple, non-inflammatory atrophy of the optic nerve, but specific optic neuritis does not of itself contraindicate the drug. Igersheimer has also noted the value of this drug in congenital syphilis, and in his experience after its use there is a negative Wassermann reaction in over one-half of the cases.

Certainly in these cases of congenital syphilis, particularly when the lesions develop in the form of parenchymatous keratitis, such as three of the patients whom I have exhibited possessed, it is important to combine with salvarsan mercury or iodide of potassium, or, more accurately, to administer these drugs in the intervals between the injections in the manner which I have already described. It is possible that the mercury and the iodide liberate the toxic elements of the infiltrates, thus enabling the salvarsan to exert its specific influence upon them. It has often been stated that salvarsan produces little or no effect on syphilitic parenchymatous keratitis. The gratifying

results, however, in two of the patients whom I have demonstrated to you clearly show its therapeutic value in this disease. It is possible that the first patient should not be regarded as a case of inherited syphilis, and that we deal with a parenchymatous syphilitic keratitis of the acquired variety, although this is not quite certain. In the other two patients there is no question that the syphilitic manifestation was an inherited one.

The patients with syphilitic iritis of the acquired type have reacted to salvarsan in the usual manner, and furnish additional evidence that in acute syphilitic processes in the uveal tract there is no remedy which equals salvarsan, especially if it is also combined with mercury and iodides, in the rapidity with which it eliminates the lesions. I may say, although I do not exhibit the patients, that I have used Ehrlich's remedy a few times in syphilitic exterior ocular muscle palsies with entirely disappointing results. This experience is in accord with that which has been recorded by other observers. In concluding I must again warn you that this remedy is not without its dangers. How to minimize them I have explained, but I beg you to remember that in giving repeated doses great care must be exercised in watching their effects, especially in the kidneys, and the smaller rather than larger doses named should be tried.

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## ACTION OF DIFFERENT AGENTS UPON THE SECRETION OF MILK.

BY ISAAC OTT, M.D.,
Professor of Physiology, Medico-Chirurgical College of Philadelphia;
AND
JOHN C. SCOTT, M.D.,
Demonstrator of Physiology.

Among the earlier experimentalists upon this subject was Röhrig.[1] He used goats, and an aspirator to empty the udder. He found strong muscular movements increased the milk secretion from 9 to 40 drops. Jaborandi also increased the secretion. Chloral reduced it, but after repeated doses it occasionally increased it to a considerable extent. It was given subcutaneously.

Atropine arrested the secretion. Strychnine by the vein increased the milk in a curarized goat. Digitalin and caffeine also increased the secretion. Bromide of potash reduced it. He also irritated several of the nerves going to the mammary gland in the goat, and thought that specific secretory nerves were improbable.

Bouchacourt[2] found that the placenta of the sheep when fed to women increased the milk secretion.

Lederer and Prizbram[3] found that injections of extracts of the fresh placenta of the goat into the vein of a goat called out in three to ten minutes an increased milk secretion, which disappeared in a half to two minutes. Heating placenta at 60° to 65° C. from half an hour to an hour destroys its milk-producing activity. We used the placenta of woman, which immediately after delivery was placed in a sterile jar and chloroform added to it. It was then dried carefully at air temperature. Some of the powder was rubbed up with distilled water, filtered through cotton, and injected into the vein of the goat. It increased the secretion. Basch[4] injected extracts of the placenta into adult animals who at one time had lactated and produced milk. He also injected these extracts into children in whom the milk secretion had ceased, but the placenta renewed it. He concludes that the so-called "witches' milk" is due to a passage into the fetus of a hormone circulating in the blood of the mother.

Aschner and Grigorin[5] experimented upon guinea-pigs. They used the placenta subcutaneously for several periods. The injection was not in the vicinity of the mammæ. In animals who had been mothers

[1] *Virchow's Archiv*, Band 67, S. 119.
[2] Société de Biologie, Feb. 1, 1902.
[3] *Pflüger's Archiv of Physiologie*, Band 144, Heft 940, S. 591.
[4] *Münchener med. Wochenschrift*, 1911, lviii, p. 2266.
[5] *Archiv f. Gynäkologie*, Band 94, Heft 3, S. 766, 1911.

they found in three to four days' colostrum and at the end of the week considerable milk. Heating the watery extract of the placenta or the placenta itself for ten minutes did not prevent the galactagogue action of the placenta. In virginal guinea-pigs the daily subcutaneous injection of placenta called out a marked secretion of milk. They also found fetal extract subcutaneously called out a milk secretion. Pilocarpine had no effect in animals who had been mothers but were free of milk. They also found watery extracts of fresh ovaries minus the corpus luteum by subcutaneous injection produced a marked milk secretion. With corpus luteum they obtained no actual secretion of milk. They also found in milk-free animals, but who had undergone lactation, that every lymphagogue when given subcutaneously called out a marked secretion of milk.

Schäfer and Mackenzie[6] found that boiled infundibulin and boiled corpus luteum increased the secretion of milk and that the anterior part of the pituitary had no effect. They obtained no effect from pilocarpine, eserine, or nicotine. Infundibulin elevated the blood-pressure, whilst corpus luteum generally caused a fall of arterial tension.

Dr. Mackenzie has found extracts of both the involuting mucous membrane and extracts of the mammary gland itself to have a marked galactagogue action. He also found that atropine did not interfere with the action of any of the above internal secretions which acted as galactagogues.

Our experiments were fifty in number, and were made on lactating goats. The same plan in experimentation was followed as described in a previous paper.[7] We made experiments with boiled thymus and boiled pineal body. We found both increased the secretion of milk. We also found that boiling the mammary gland did not prevent its galactagogue action, which has been shown by Mackenzie to increase the flow of milk. We then tried the effect of a dose of atropine, 1/50 of a grain by the vein, before the injection of the corpus luteum, infundibulin, and pineal gland, but they still increased the milk secretion, although not to as great an extent as before the atropinization. We have previously shown that the injection of the second dose of infundibulin is not followed by as great a secretion of milk. In the lactating goat we tried several successive injections by the vein of ½ Cc. of infundibulin. The normal milk secretion was 4 drops every five minutes. The first increase was 101 drops, the second 32 drops, the third 12 drops, the fourth 20 drops, the fifth 10 drops, and the sixth 7 drops.

The mammary gland is very sensitive to infundibulin; even 1/1000 of a drop increased the milk secretion a drop, whilst 1/100 of a drop increased it 5 drops.

We found pilocarpine, 1/20 grain by the vein, to increase the milk secretion to a marked degree. If, however, 1/50 grain of atropine was given just previous to the injection, then the pilocarpine was without effect. If we waited forty-eight hours after the venous dose of atropine (1/50 gr.) and then injected 1/3 grain of pilocarpine intravenously, then the flow of milk increased to a small extent. Digitalin increased the secretion of milk. Caffeine citrate, eserine, nicotine, and muscarine had no effect in augmenting the milk secretion.

Atropine arrested the milk secretion. Antipyrin reduced the flow one-half. We also studied the effect of proto-albumose and deutero-albumose. They caused a considerable increase in the secretion of milk. Peptone increased the secretion, but not so much as the albumoses. Glucose (gr. xx) caused a marked increase. Sodium chloride increased it to a marked degree. Potassium chloride also increased it, whilst calcium chloride only slightly augmented it.

The question now arises, how do these agents increase the secretion of milk? Is it nervous, vascular, or cellular, or a combination of all of them? Goltz and Ewald[8] after previous extirpation of the lumbar cord in dogs found milk to be secreted after pregnancy. Starling and Jane Lane-Claypon from experiments found a hormone which they believed to be generated in the embryo, and through the placenta passed into

[6] Proceedings of the Royal Society, Series B, No. B 568, vol. 84, p. 16.

[7] THERAPEUTIC GAZETTE, October, 1911.

[8] *Pflüger's Archiv*, Band 63, S. 385, 1896.

the blood and then to the mammary gland. The Blazek twins had a common circulation, but independent nervous systems, yet pregnancy and delivery in one was followed by lactation in the glands of both. Mackenzie found that atropine, which paralyzes secretory nerves, did not prevent the galactagogue action of infundibulin and corpus luteum. We have found the same to be true for thymus and the pineal gland.

Mironoff,[9] in 1895, a Russian physiologist, in a primiparous goat resected to the length of two centimeters all the nerves of the mammary gland a month and a half before the time of delivery. When this arrived the mammary glands nevertheless enlarged as in a normal animal and secreted in the usual manner. He repeated the experiment with a similar result. In experiments upon goats[10] on the external spermatic nerve, independently of the branches whose excitation caused erection of the nipple, there were two other branches whose irritation caused at the same time a secretion and a change in the circulation. In another experiment upon a bitch the excitation of the peripheral end of the mammary nerve resulting from the union of the fourth and fifth lumbar pair lowered blood-pressure in the mammary artery and gave out an abundant jet of milk when the nipple was compressed. Compression of the nipple of the other breasts was followed by only a few drops of milk. It would seem that this nerve was both dilator and secretory. But Eckhard and Von de Sinety after cutting the external spermatic nerve found no influence of any account upon the quantity and composition of the milk.

Röhrig, by electric and all possible chemical irritation of the nerves going to the milk ducts, could not find any secretory nerves. It is probable that the positive results in the goat and bitch, which have been just described as evidence of secretory nerves, are vasodilator effects. The flow of milk by suction and its continuance in man can also be due to reflex vasodilator effects.

[9]Gley's Physiologie, p. 722.
[10]Gley's Physiologie, p. 722.

Schäfer thought he saw a greater vascularity than normal in the mammary glands when laid open, after the use of infundibulin. There is no doubt that the hormones of the internal secretions cause increased lactation, and that there is probably a vasodilatation in the gland itself which plays the major part in the augmented secretion, aided by a stimulation of the gland cells, rather in a direct manner than through any secretory nerves acting upon the cells. Ott and Scott have shown that corpus luteum, thymus, pineal body, and infundibulin are vasodilators in the male genitalia, hence it is probable that they are vasodilators in the mammary gland. Infundibulin is a vasodilator for the kidney; pineal body also dilates the renal vessels.

Transplanted glands can secrete milk, and certainly no nervous agent is concerned in this case.

Appended are some of the experiments.

*Experiment 1.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 3.00 | 12 | in 5 minutes. |
| 3.05 | 10 | |
| 3.10 | 11 | |
| 3.15 | 53 | Two grains of mammary gland by the vein. |
| 3.20 | 40 | |
| 3.25 | 15 | |
| 3.30 | 10 | |

*Experiment 2.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 2.40 | 11 | in 5 minutes. |
| 2.45 | 12 | |
| 2.50 | 11 | |
| 2.55 | 59 | 1/20 grain of pilocarpine. |
| 3.00 | 16 | Profuse salivation. |
| 3.05 | 10 | |

*Experiment 3.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 2.45 | 9 | in 5 minutes. |
| 2.50 | 8 | |
| 2.55 | 8 | |
| 3.00 | 5 | 1 grain antipyrin by vein. |
| 3.05 | 2 | |
| 3.10 | 0 | |
| 3.15 | 3 | |
| 3.20 | 1 | 1 grain antipyrin. |
| 3.25 | 2 | |
| 3.30 | 0 | |

*Experiment 4.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 3.05 | 4 | |
| 3.10 | 4 | |
| 3.15 | 3 | |
| 3.20 | 17 | 4 grains of deutero-albumose. |
| 3.25 | 12 | |
| 3.30 | 6 | |
| 3.35 | 4 | |

*Experiment 5.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 2.45 | 8 | |
| 2.50 | 9 | |
| 2.55 | 8 | |
| 3.00 | 20 | 10 grains glucose by vein. |
| 3.05 | 9 | |
| 3.10 | 5 | |
| 3.15 | 4 | |
| 3.20 | 4 | |

*Experiment 6.—Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 2.55 | 12 | |
| 3.00 | 8 | |
| 3.05 | 10 | |
| 3.10 | 8 | 30 grains of sodium chloride in 5 Cc. of water. |
| 3.15 | 33 | |
| 3.20 | 10 | |
| 3.25 | 10 | |
| 3.30 | 9 | |

*Experiment 7.—Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 2.45 | 5 | |
| 2.50 | 4 | |
| 2.55 | 4 | |
| 3.00 | 5 | |
| 3.05 | 15 | 15 grains calcium chloride. |
| 3.10 | 10 | |
| 3.15 | 5 | |

*Experiment 8.—Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 3.00 | 6 | |
| 3.05 | 5 | |
| 3.10 | 5 | |
| 3.15 | 10 | 10 grains of potassium chloride. |
| 3.20 | 5 | |
| 3.25 | 4 | |
| 3.30 | 3 | |
| 3.35 | 2 | |

*Experiment 9.—Lactating Goat.*

| P.M. | Gtt. | |
|---|---|---|
| 3.50 | 4 | |
| 3.55 | 4 | |
| 4.00 | 4 | |
| 4.05 | 105 | ½ Cc. of a 20-per-cent extract of the posterior part of the pituitay gland. |
| 4.10 | 30 | |
| 4.15 | 4 | |
| 4.20 | 36 | ½ Cc. infundibulin. |
| 4.25 | 10 | |
| 4.30 | 22 | ½ Cc. infundibulin. |
| 4.35 | 6 | |
| 4.40 | 26 | ½ Cc. infundibulin. |
| 4.45 | 16 | |
| 4.50 | 26 | ½ Cc. infundibulin. |
| 4.55 | 20 | |
| 5.00 | 18 | ½ Cc. infundibulin. |
| 5.05 | 25 | |
| 5.10 | 16 | |
| 5.15 | 10 | |

*Experiment 10.—Lactating Goat.*

Infundibulin is a 20-per-cent extract of posterior part of the pituitary.

| P.M | Gtt. every five minutes. | |
|---|---|---|
| 2.55 | 4 | |
| 3.00 | 4 | |
| 3.05 | 4 | |
| 3.10 | 5 | 1/1000 of a drop of infundibulin. |
| 3.15 | 3 | 1/1000 " " " " " |
| 3.20 | 1 | 1/500 " " " " " |
| 3.25 | 1 | 1/100 " " " " " |
| 3.30 | 6 | |
| 3.35 | 1 | |
| 3.40 | 5 | 1/100 " " " " " |
| 3.45 | 3 | |
| 3.50 | 3 | |
| 3.55 | 2 | |

## A REVIEW OF THE DANGEROUSLY POISONOUS SNAKES OF THE UNITED STATES.

BY HENRY TUCKER, M.D.,
Curator of the Academy of Natural Sciences of Philadelphia; Fellow of the College of Physicians, etc.

The dangerously poisonous snakes of the United States are representatives of two families, namely:

First, the Elapidæ.

Second, the Viperidæ.

The subfamily, Elapinæ, have permanently erect perforated fangs in the fore part of the upper jaw. These fangs have a well-marked groove on the anterior surface, and excepting the reserve fangs are not followed by other maxillary teeth (Plate II, Fig. 1). The head plates are normal, two nasals, no loreal; scales smooth; subcaudals in two rows; pupil a vertical oval; body cylindrical; head not distinct. Two well-defined species are found in the United States.

The Eastern variety, *Elaps fulvius*, Linn (Plate I, Fig. A), coral or harlequin snake, rarely reaches a length of three feet. The following description is of a specimen in my own collection: Head small, not distinct, snout bluntly rounded, eyes beady; scales smooth, brilliantly colored with vermillion, yellow, and black; the nose and anterior part of the head to the posterior end of the frontal plate, including the orbit, is black; a yellow ring covers the parietal from the posterior part of the orbit, to the angle of the mouth, followed by a black of eight scales width succeeded by narrow yellow of two scales, followed by red of seven scales. The body colors consist of

black and red rings separated by narrow yellow; the red spaces on the body are freckled with black; the tail is alternately black and yellow; the rings are complete, but beneath the colors are dull. There are several harmless snakes that mimic the poisonous coral, namely (Plate I): The scarlet snake, *Cemephora coccinea* (Fig. C); the scarlet king snake, *Ophibolus doliatus coccineus* (Fig. E); the Southern milk snake, *Ophibolus doliatus clericus* (Fig. D); the Arizona ring snake, *Ophibolus zonatus* (Fig. F); Le Conte's snake, *Rhinochilus lecontei* (Fig. G).

All these species have much the same color scheme as the harlequin, either in half or complete rings, but the arrangement of black bordered by yellow is never found in the harmless varieties. The coral snakes belong to a subfamily which includes the most deadly reptiles of the Old World, as the cobras and their allies of Asia, Africa, and the Malay Archipelago, and the many Australian representatives—the black, the brown, the tiger, and the death adder—and as their poison is similar, they must be ranked as reptiles distinctly dangerous to man. On account of their nocturnal and burrowing habits, sluggish disposition, and their comparatively short fangs, accidents are rare, and they do not receive the respect due them.

The Eastern variety ranges from South Carolina south-westward to Mexico. It is of burrowing habits, frequently found in decaying vegetation and under the bark of fallen trees; the food consists of lizards and smaller snakes.

The Western representative is the Sonoran coral snake (Plate I, Fig. B), *Elaps euryxanthus*, Kennicott. It is probably of similar habits, but differs somewhat in the arrangement of its colors; the black of the muzzle extending back over the parietals is followed by a yellow ring, then by a broad red band. The yellow rings on the body are broader than in fulvius, and the red spaces are not mottled with black. Distribution—Central and southern Arizona and northern Mexico.

The last and by far the most important family to be considered are the Viperidæ, subfamily Crotalinæ, commonly and correctly known as the pit vipers, a most fortunate title, as it indicates their relation to the true vipers and points out a remarkable anatomical peculiarity, which at once distinguishes them from all other reptiles; these serpents can be placed in one of the following genera:

1. Without rattle—Ancistrodon { Contortrix. Copperhead. / Piscivorus. Water moccasin.

2. With rattle { Sistrurus—Top of head with large plates. / Crotalus—Top of head with small scales.

The pit is a deep hole situated between the nostril and the eye, but on a lower plane. It extends well into the maxillary bone, is lined with epithelium, and connected with the brain by a thick nerve. The external layer of the lining of the pit is continuous with the skin of the head, but on entering the cavity changes to thin, flat, nucleated epithelium. Beneath this is a layer of fibrous connective tissue in which the terminal filaments of the nerve end in groups of granular substance containing round pale nuclei. This arrangement suggests a true sense organ, and as the function of the pit cannot be explained, it may be, as suggested, the seat of a sixth sense, unknown to man. The pit is of great practical value, as it at once enables us to identify a dangerously poisonous snake.

The poison apparatus of the Crotalinæ consists of a large pair of perforated fangs immovably fixed in the anterior portion of the upper jaw. The maxillary bone through its articulation with the lacrimal in front and above and the external pterygoid bone behind and below is freely movable and permits the fangs, when not in use, to be folded back against the roof of the mouth (Plate II, Fig. 3). The mechanism of the erection of the fang is briefly as follows: The sphenopterygoid muscle, which has its origin along the median ridge of the base of the skull, runs backward and is inserted in the posterior end of the external pterygoid bone, hence when this muscle contracts

the bone is drawn forward and pushes against the lower end of the maxilla. As the upper end of the maxilla is held by its articulation with the lacrimal, the tip of the fang must be directed downward and forward. The retractor muscle is the external pterygoid, which arises from the joint between the quadrate bone and the lower jaw. The fibers run forward and are inserted on the outside of the maxilla below its articulation with the external pterygoid, so when this muscle contracts the maxillary bone is drawn back and the point of the fang moves upward and backward (Plate III, Fig. 1).

The fang proper closely resembles an ordinary hypodermic needle (Plate III, Fig. 2); it consists of a sharply pointed curved tooth. The poison canal is situated within the convex side, gaining entrance by a slit-like opening near the base and has its exit by a narrow slit-like opening near the tip. The probable reason for this is to prevent plugging when the fang is embedded, and so not interfere with the flow of venom. As previously stated, the fang is fixed solidly in the jaw; posteriorly the bone is hollowed to hold the tooth sac. In the alveolar process beneath the mucous membrane lie the reserve fangs, each posterior one being smaller and less developed than the one in front; as many as eight to ten pair of more or less well-developed fangs may exist. When the active fang is normally shed or accidentally lost, its place is taken in the course of a few days by the first reserve. The functional fang at rest is covered by a loosely applied membrane known as the vagina dentis. This is rolled back when the fang is extended.

The venom gland is evolved from the yellow portion of the salivary gland. It is of an almond shape with the point toward the front; is situated below and behind the eye and is connected with the fang by a narrow duct. The duct runs forward; beneath the eye it turns abruptly upward, from which point it follows the posterior wall of the pit and finally passes over the rounded front edge of the maxillary bone, at the base of which it meets but does not enter the upper opening of the canal of the fang.

The gland proper consists of a cavity into which open the ducts of the true poison-secreting glands; it is surrounded and supported by a double layer of fibrous tissue, which is continued posteriorly as a ligament to be inserted on the articulation of the jaw. A short band of tissue attaches it firmly to the skull, while a third one below is attached to the external pterygoid muscle (Plate IV).

The muscles brought into play in the emptying of the gland are the three temporals. The middle temporal arises from the posterior half of the parietal bone, runs down and forward, to be inserted into the lower jaw; the posterior temporal arises from the quadrate bone and is inserted on the inner side of the entire length of the angular bone of the lower jaw.

The anterior temporal, the true muscle of expulsion, arises from the upper posterior portion of the tendinous capsule of the gland, runs backward under the ribbon-like ligament, winds round the joint, and is inserted broadly upon the lower jaw; so it may be seen that the middle and posterior muscles are principally used to close the mouth, while the function of the anterior is to empty the sac. This makes the emission of the venom a voluntary one on the part of the reptile. Dr. Mitchell, to whose work I have so largely referred in the above description, has proved a further safeguard exists. Anterior to the sudden upward turn he has demonstrated a sphincter muscle surrounding the duct.

At the time of the blow the snake is either symmetrically or partially coiled, the neck and forward portion of the body is thrown into a sigmoid position, the head is elevated and drawn slightly back. At the actual time of striking the mouth is widely opened and the fangs thrust forward, but this motion is so rapid as to be hardly discernible and impossible to describe. As the neck and forward portion of the body alone are used in this motion a snake can never strike a greater distance than one-half its length, and in fact cannot strike accurately

a greater distance than one-quarter, or at most one-third. The quantity of venom ejected varies largely, depending on the size, previous activity, and variety of the snake. It may be said to vary between 2 and 30 minims, though some authorities claim a much larger amount.

Taking this group up as individuals, we will first consider the copperhead, *Ancistrodon contortrix,* Linn (Plate V). I will describe from a specimen in my own collection. Head scaleation normal; loreal present; upper labials eight, separated from the eye by four rows of suboculars; dorsal scales carinated in 23 rows; subcaudals undivided. Color, grayish-brown with rich chestnut cross-bands of inverted "Y" shape having darker borders, many alternating on the back. The top of the head is a brighter brown with a distinct coppery tinge, the lips and cheeks are creamy yellow, the line of difference extending from above the nostril and eye to above the angle of the mouth. There are large reddish-brown blotches on the sides and edge of ventrals. Abdomen, dull yellowish; tongue, forks white, base pink; form moderately slender, head distinct. Juvenal markings similar, except tail, the last half of which is greenish-yellow.

Raymond L. Ditmars, whose books I have quoted so freely, suggests that the young copperhead employs its yellow tail to attract frogs, relying on the protective coloration of the body and the similarity of the rapidly wriggled tail to a yellow grub or maggot. This theory seems quite reasonable.

Range—Massachusetts south to Florida line; west to include Texas; in dry, wooded, rocky districts.

The water-moccasin, or cotton-mouth, *Ancistrodon piscivorus,* Lacépède (Plate VI), is described from a specimen in my own collection. Form stout, head broad and flat on top, no loreal, nasal divided, lower wall of orbit formed by third upper labial, a pair of small plates behind parietals, preoculars two, upper long, extending to postnasal, upper labials large, eight in number, lower ten. Twenty-five rows of heavily carinated scales, subcaudals double in last half. Color, dark greenish-brown with indistinct darker markings, head above black, an indistinct brown streak bordered above by yellow from behind the eye to the angle of the mouth above the labials; labials and chin yellow, with three dark vertical bars on the fourth, sixth, and seventh labial plates; rest of the head dark-brown; inside of mouth white; abdomen yellow, with brownish blotches. The young are reddish-brown, with broad dark bands edged with white. End of tail, greenish-yellow. Distribution—same as *Elaps fulvius,* always found in the neighborhood of water; it prefers low coastal regions with sluggish streams.

The rattlesnakes, Sistrurus and Crotalus, can be immediately told by the unique development on the end of the tail, which is only found in reptiles of this group.

The rattle is a series of thin, horny cones consisting of two or three swellings and two constrictions, the free edge being turned in to fit loosely into the groove on the preceding segment. The function is unknown; the following theories have been advanced: One, not tenable, is that it is a providential arrangement to prevent injury to animals and man. Another, to attract birds, by the sound mimicking that made by certain insects. The most plausible explanation is that it is used as a call during the mating season.

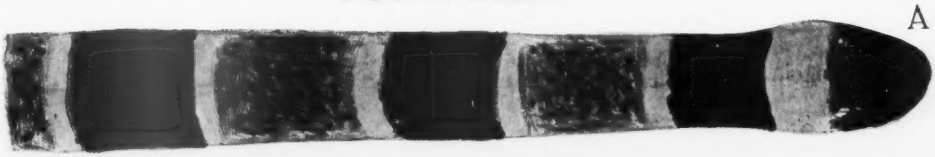
As a matter of fact, nearly all harmless snakes rapidly vibrate the tail when excited; if this occurs among dry leaves the sound is startlingly like the whir of the rattle.

The perfect condition of the rattle in freshly captured specimens strongly suggests that it is seldom used by the snake in the natural state; the number of segments is no indication of the age of the reptile, but depend on nutrition and the number of times the skin has been shed. Twelve or fourteen rings would represent a rattle of large size; one in the Academy collection has twenty-four, but on close inspection appears to be made of two and probably three rattles snapped one upon the other. It has been calculated that the rattle in action is vibrated about 100 times per minute. The tongue

# PLATE I

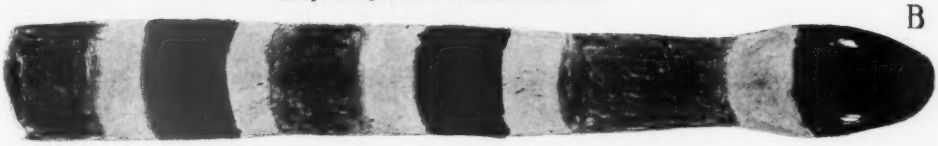
*Elaps fulvius*—Coral snake.

A



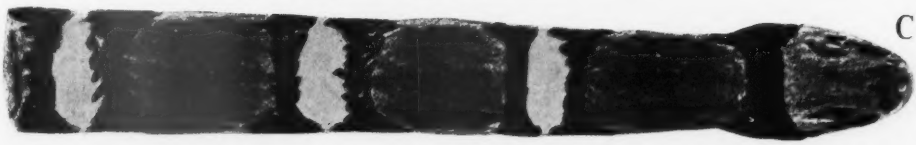
*Elaps Euryxanthus*—Sonoran coral snake.

B



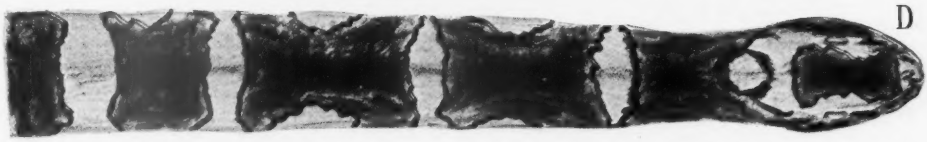
*Cemophora Coccinea*—Scarlet snake.

C



*Ophibolus doliatus, clericus*—Southern milk snake.

D



*O. D., Coccineus*—Scarlet king snake.

E

*Ophibolus Zonatus*—Ringed snake.

F

*Rhinochilus lecontei*—Le Conte's snake.

G

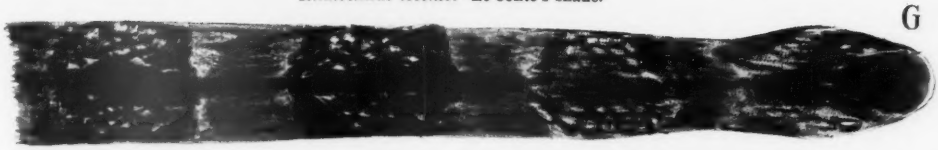


Diagram to show the two poisonous Elaps, A and B, and some of the harmless mimics, C, D, E, F, G.

# PLATE II

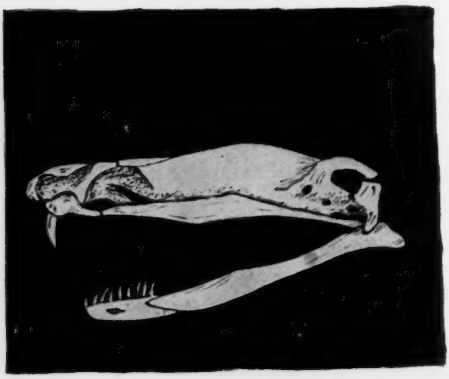


Fig.1

Fig.3

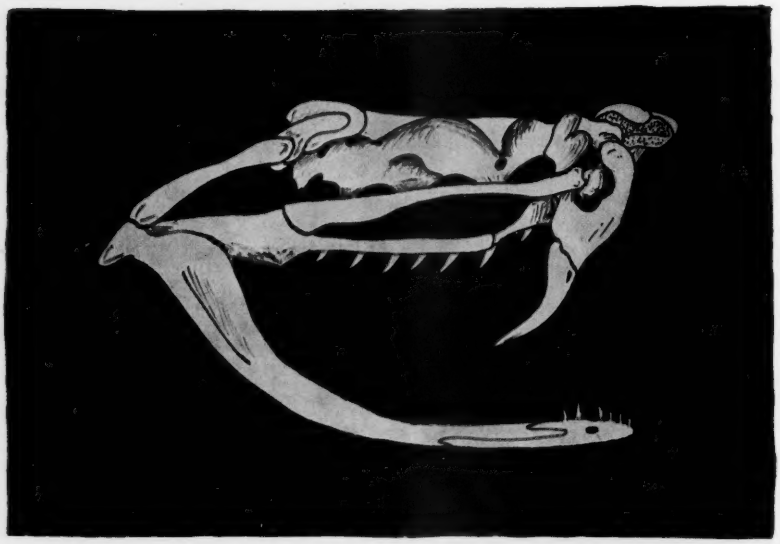


Fig. 2

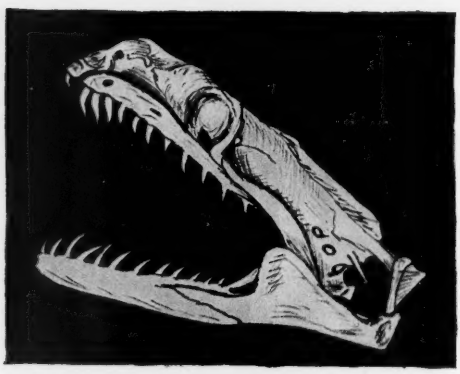


FIG. 1.—Skull of *Elaps fulvius*. Showing permanently erect perforated fang, not followed by other teeth in upper jaw.
FIG. 2.—Skull of *Python variegata*, a typical harmless snake. Showing all teeth solid, not grooved or perforated.
FIG. 3.—Skull of rattlesnake. Showing large curved fang immovably fixed in the shortened triangular upper jaw and, except the reserve fangs (not drawn), not followed by other maxillary teeth.

# PLATE III

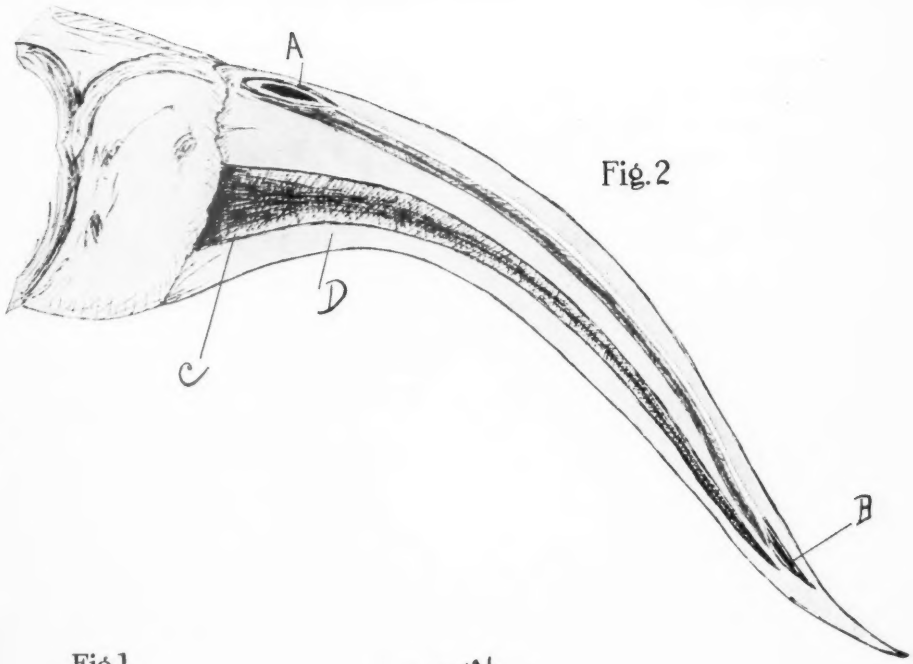



Fig. 2

Fig. 1

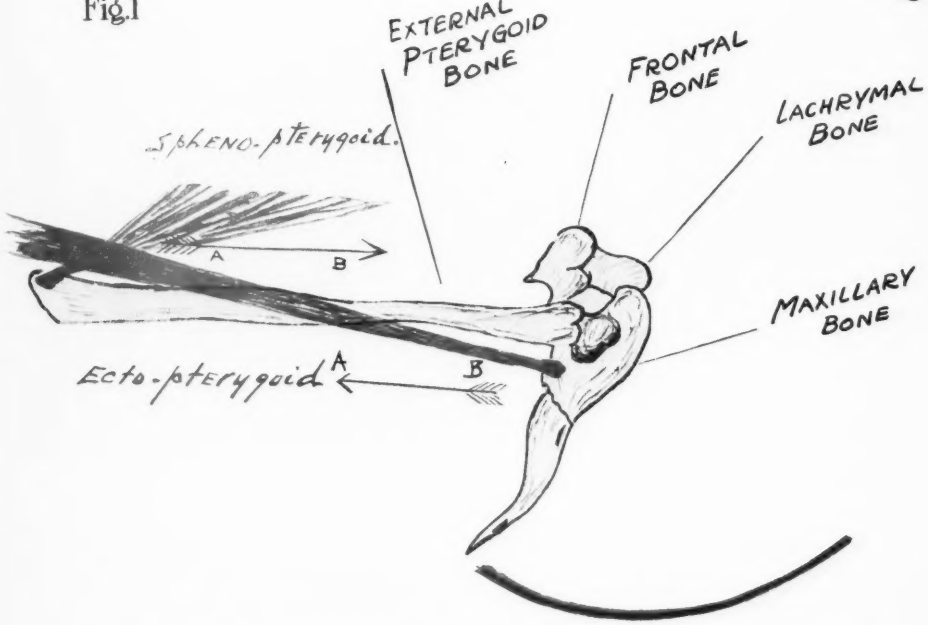
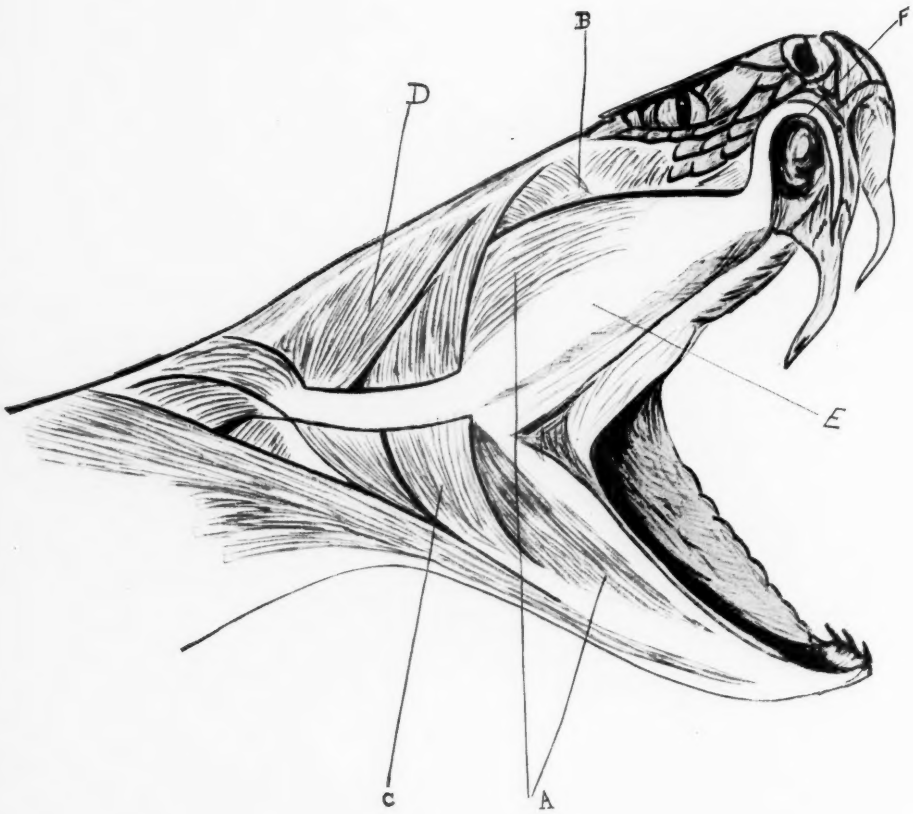



FIG. 1.—Diagram to show the elevation of the fang. When the sphenopterygoid contracts it pulls from A to B, thereby pulling forward the external pterygoid bone, thus pushing the lower end of the maxilla forward, the upper end of the maxilla being held by its articulation with the lachrymal; thereby the point of the fang points outward and upward. The ecto-pterygoid, pulling backward from B to A on the maxilla, folds the fang against the roof of the mouth.

FIG. 2.—Diagram to show poison fang of pit vipers. A, opening for entrance of poison duct; A-B, poison canal; B, exit opening of canal near tip of fang; C, pulp cavity; D, dentine.

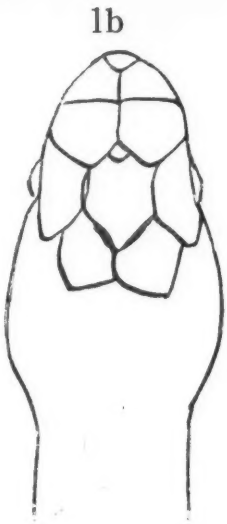
# PLATE IV

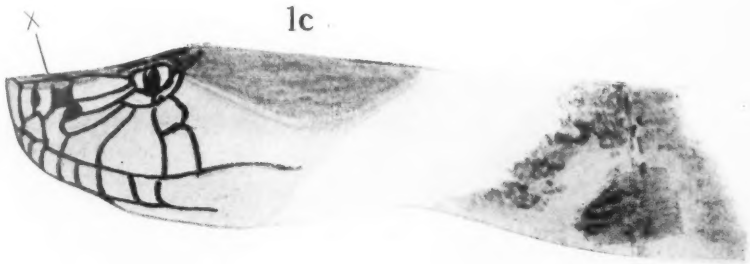



A, anterior temporal muscle; B, posterior temporal muscle; C, middle temporal muscle; D, digastricus muscle; E, venom gland; F, venom duct. Diagram to show muscles: A, anterior temporal, the muscle used in emptying the gland; B, C, D, muscles used in opening and shutting the mouth.

THERAPEUTIC GAZETTE. MAY 15, 1912.

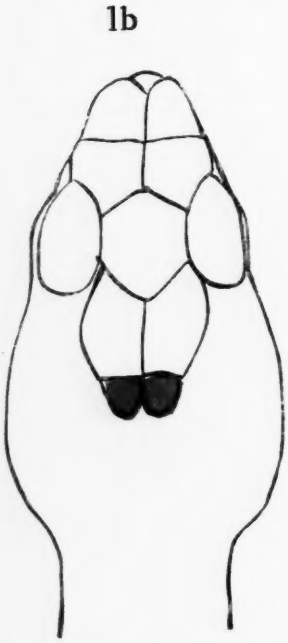
# PLATE V

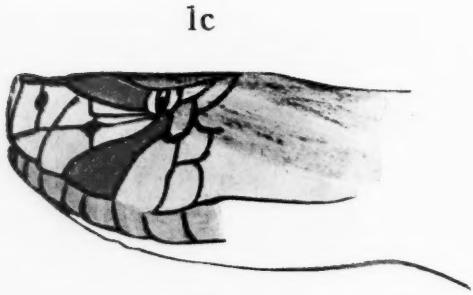



Copperhead—*Ancistrodon contortrix*, "Linn." Diagram to show color scheme and head scaleation of the copperhead. Diagnosis: X, loreal scale, not present in the water-moccasin.

# PLATE VI



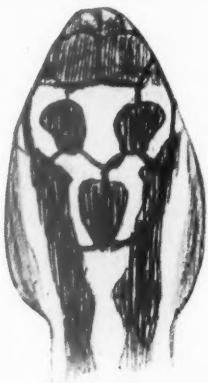




Water-moccasin—*Ancistrodon piscivorus*, "Lacépède." Diagram to show color scheme and head scaleation of the water-moccasin. Diagnosis: 1B, red scales, occipitals; 1C, upper red, preocular, in contact with post-nasal, lower red, third labial forming the floor of orbit. Arrangement not found in the copperhead.

# PLATE VII

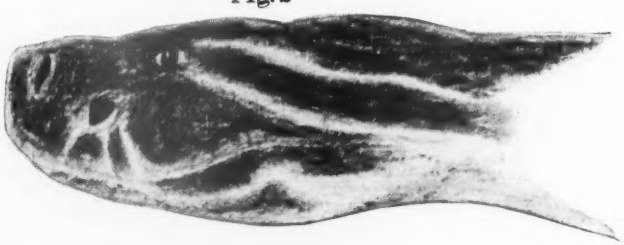
Fig.1

1b

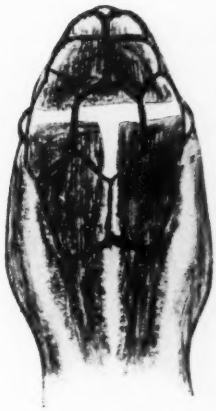


1c

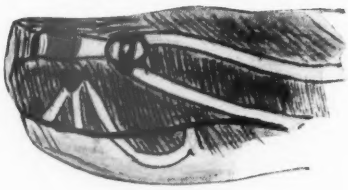
Fig.2



2b



2c



Genus Sistrurus, "Garman." Pigmy rattlesnakes. May be distinguished from other rattlesnakes by their smaller size, diminutive rattle, and having the scales on the top of the head arranged like the harmless snakes. Diagram to show color scheme and head scaleation.

FIG. 1.—*Sistrurus Catenatus*, "Rafinesque." Massasauga. Diagnosis: The massasauga. Light line from nostril to angle of mouth. Dark spot covers center of parietal suture. Preocular in contact with postnasal.

FIG. 2.—*Sistrurus miliarius*, "Linn." Pigmy rattlesnake. Diagnosis: The pigmy rattlesnake. Light line from eye to angle of the mouth. Light band the entire length of parietal suture. Preocular separated from post-nasal by a loreal.

# PLATE VIII

Fig. 1

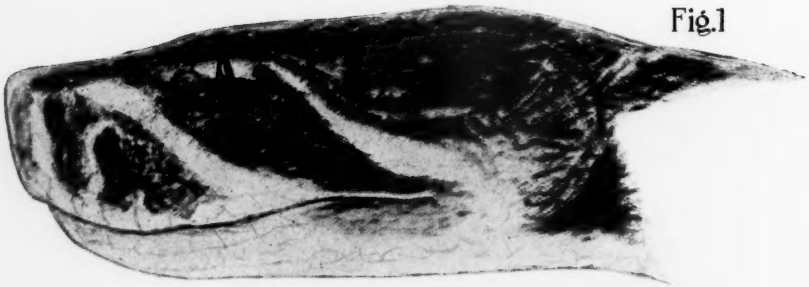
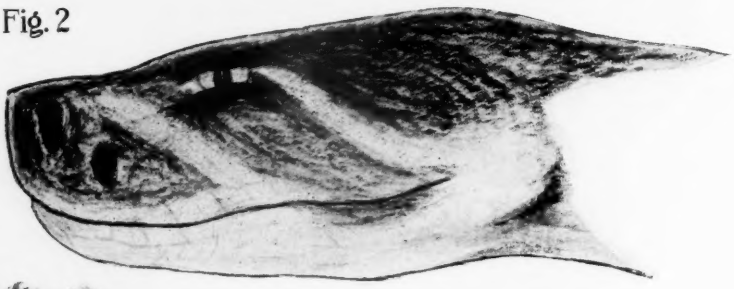


Fig. 2



1a

2a

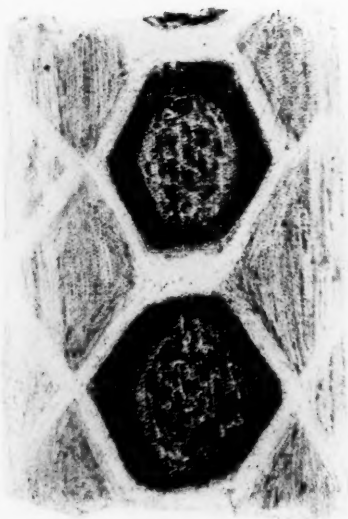


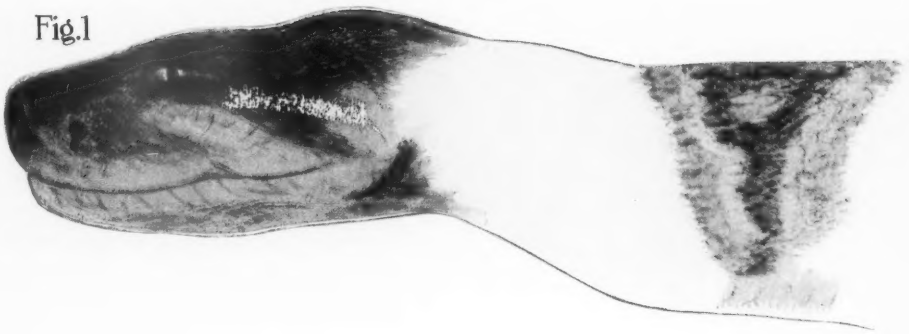
Diagram to show color scheme and markings.

FIG. 1.—*Crotalus adamanteus*, "Beauvais." The Southern diamondback. Diagnosis: Vertical white line in front of nostril; ground color dark; diamond dorsal marking in contact; two loreal scales.

FIG. 2.—*Crotalus atrox*, "Baird and Girard." The Western diamondback. Diagnosis: White line absent in front of nostril; light color; truncated diamonds; one loreal scale.

# PLATE IX

Fig.1



2a

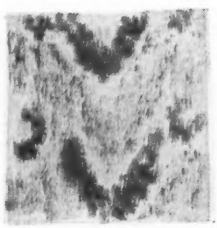


Fig. 2

Diagram to show color scheme.

FIG. 1.—*Crotalus molossus*, "Baird and Girard." Dog-faced or blacktailed rattlesnake. Diagnosis: Muzzle broad, nose scales larger than other species; snout and tail black. Each scale a single color; the corners of most of the dorsal blotches are open and extend to edge of ventrals.

FIG. 2.—*Crotalus horridus*, "Linn." Banded or timber rattlesnake. Diagnosis: color, roll sulphur or velvety black; a series of chevron-like dorsal markings. Light line from supraocular to angle of mouth, back of which is a dark spot.

# PLATE X

Fig. 2

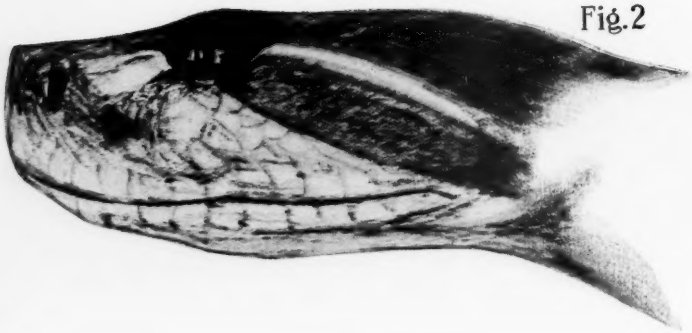


Fig. 4

Fig. 3

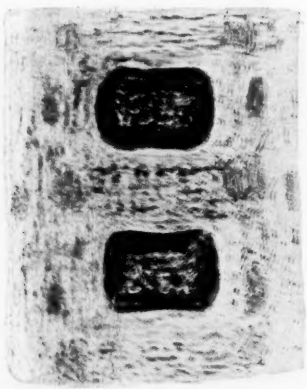


Fig. 1

Diagram to show color scheme and head markings.

FIG. 1.—*Crotalus confluentus*, "Say." Prairie rattlesnake. Diagnosis: A dark oblique band begins at anterior corner of eye, dipping sharply to angle of mouth.

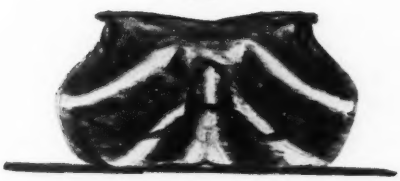
FIG. 2.—*Crotalus Oregonus*, "Holbrook." Western rattlesnake. Diagnosis: The dark oblique band begins posterior to center of orbit and runs directly to angle of the mouth.

# PLATE XI

Fig. 2

Fig. 1

2a



1a

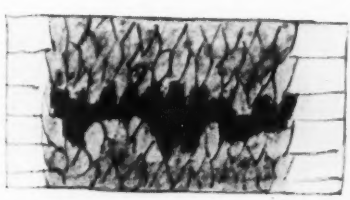


FIG. 1.—*Crotalus Lepidus*, "Kennicott." Smooth or Green rattlesnake. Diagram to show color scheme and head scalcation. Diagnosis: Color greenish; scales on head large; body scales smoother than other members of this genus; dorsal markings serrated; double or single blotch on nape of neck.

FIG. 2.—*Crotalus Willardii*, "Meek." Willard's rattlesnake. Diagram to show color scheme and markings. Diagnosis: Color chocolate-brown. A white median rostral line to lower jaw, expanding between two dark bars.

THERAPEUTIC GAZETTE, MAY 15, 1912.

# PLATE XII

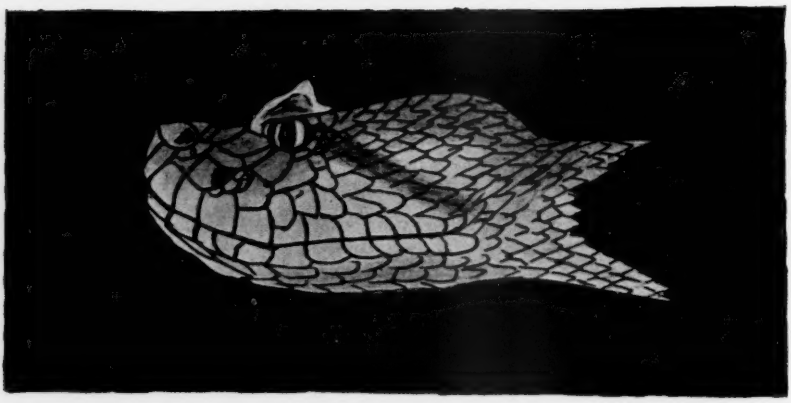


Fig.1

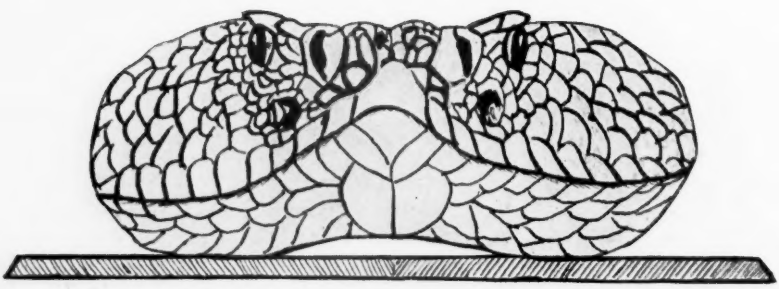


Fig.2

FIG. 1.—*Crotalus Cerastes*, "Hallowell." Horned rattlesnake or sidewinder. Diagram to show head scaleation. Diagnosis: Supraocular elongated into a horn-like process directed upward and turned slightly inward on itself.
FIG. 2.—*Crotalus Mitchellii*, "Cope." White rattlesnake. Diagram to show head scaleation. Diagnosis: Color pale, dorsal markings indistinct. Rostral plate separated from anterior nasal by small scales.

of all snakes is a tactile organ, and in no way connected with transference of venom.

Genus *Sistrurus,* Garman (Plate VII), misnamed the ground rattlesnake, may be distinguished from Crotalus by its smaller size, diminutive rattle, and by the arrangement of the scales on the top of the head like that of the harmless snakes. Two species are recognized:

1. Miliarius: Preocular separated from postnasal by a loreal. Light line from eye to angle of the mouth. Light band the entire length of the parietal suture.

2. Catenatus: Preocular in contact with postnasal. Light line from nostril to angle of the mouth. Dark spot covers the center of parietal suture.

*Sistrurus miliarius,* Linn (Plate VII, Fig. 2), the pigmy rattlesnake, I will describe from No. 7217, Academy collection: Ground color ashy, minutely peppered with black, 38 irregular purplish-black dorsal spots narrowly margined with white, the interspaces of ground color narrower than the spots, the blotches posteriorly tending to form rings. A distinct reddish vertebral line from the neck extends backward in the interspaces, but not involving the spots; three lateral rows of subquadrate alternating blotches, the upper row smaller and less distinct than the two lower; ventrals yellow, marbled with black. A narrow light line extends from lowest part of the orbit to angle of mouth; above this a broader brown stripe margined above with light; a faint light mark crosses the forepart of the supraoculars; from this are two parallel wavy dark bands running back to the first dorsal blotch. Loreal present; scales in 23 rows; tail proportionately long, rattle diminutive. Distribution—North Carolina to include Florida, west of Texas, Mississippi Valley to Illinois.

*Sistrurus Catenatus,* Rafinesque (Plate VII, Fig. 1). The Massasauga is larger and stouter than the pigmy, with a shorter tail and a more fully developed rattle. The usual color is grayish-brown, with from 36 to 45 rich brown dorsal blotches with lighter centers and narrow yellow margins; toward the tail the blotches tend to form transverse bands. A white line extends from the nostril to the angle of the mouth; a white line crosses the anterior part of the supraoculars. A dark spot covers the parietal suture. Two wavy brown parallel stripes margined with white run back from the supraoculars, to the first dorsal blotch. A broad brown band edged with white extends from the rear margin of the eye to the neck. Two small yellow spots diverge from the pit to the lip. Rest of the head a bright chestnut brown. The abdomen is yellow mottled with black. Lateral blotches like Miliarius; scales in 23 to 27 rows, usually 25, preocular in contact with postnasal.

From the Academy's collection I have noted the following color variations: Nos. 7238-9 are nearly black with obscure markings; No. 7240, ventrals black; No. 7241, color pale gray. No. 7243 has 23 rows, 37 spots, and yellow ventrals, while No. 7244, collected in the same locality, has 27 rows and black ventrals.

Distribution—Western New York to Kansas, north to Canada. Subspecies.

*Sistrurus Catenatus,* Edwardsii, or Consors (B. & G.). I include the above names purposely, as after examining a large number of specimens and finding the scale rows and number of spots to vary, the former from 23 to 25, the latter from 37 to 50, I do not believe a second subspecies should be recognized.

I have taken No. 12096 as closely approaching the type. Scales in 25 rows, two outer smooth, small lower loreal, preocular in contact with postnasal; color light brown, with 45 dorsal and 8 caudal blotches, the latter subcircular; ventrals 150, subcaudals 27.

Crotalus (Linn): Subcaudals undivided, tail terminating in a rattle. Twelve distinct species are found in the United States.

*Crotalus molossus,* B. & G. (Plate IX, Fig. 1). Dog-faced or blacktailed rattlesnake. No. 15631, Academy collection: Large size, muzzle broad, rostral small triangular; nose scales larger than other species, number eight, all in contact, four rows between the supraoculars; same num-

ber between suboculars and upper labials; dorsal series in 29 rows. Color dull sulphur, plates of muzzle blackish, tail black; on the back a series of chestnut-brown transverse lozenges 10 to 12 scales wide, 4 to 5 long, embracing on each side of the spine a lighter spot; the bordering scales are of a paler color. The exterior corners of the lozenge are mostly open and extended to the edge of the ventrals. A diagnostic character of this species is that each scale is of a uniform color. No. 17897, though otherwise typical, presents but 25 rows of body scales, while No. 16530 has scales in 27 rows. Habitat—Arizona, New Mexico, southward.

*Crotalus adamanteus,* Beauvois (Plate VIII, Fig. 1). The diamondback is the largest North American poisonous snake, and grows to a length of eight feet. A specimen in my collection has the following characters: Color gray-brown, faintly tinged with yellow, a series of diamond-shaped dorsal spots of black enclosing ground color, the black edged with pale yellow borders of one scale width; these cross on the fifth or sixth lateral row to extend to the ventrals, the extended lines enclosing a dark mottled area. The dorsal markings are in contact on the body, toward the tail, which is olive, ringed with black; they tend to become cross-bands. The abdomen is yellow; rattle nine segments and a button. A light line runs from the posterior end of the supraoculars to the row of scales above the mouth; a second line from behind the nostril to and including 7, 8, 9 upper labials. There is also a distinct white line in front of the nostril, and two short bars from the pit to and including the labials. Head broad, triangular, rostral high; two small loreals separate two long preoculars from postnasal; supraoculars large, extending well over the eye, eight scales between, four between the suboculars and upper labials. Rest of head covered with small carinated scales; body scales in 27 rows. Habitat—North Carolina southwest to Louisiana; most abundant in low coastal region.

*Crotalus atrox,* B. & G. (Plate VIII, Fig. 2). The Western diamondback is of smaller size but closely resembles Adamanteus. It has the following points of difference: One loreal, ground color lighter, absence of vertical line in front of nostril. The diamond markings are truncated. The tail is light, strongly marked with black half-rings. No. 15165, Academy collection, has six rows between supraoculars, four between suboculars and labials. Scales in 25 rows; ventrals 178; subcaudals 23. Distribution—Northern Mexico, Central Texas, to Arizona.

*Crotalus atrox ruber,* Cope. This subspecies is smaller than Atrox, rostral wider than high; eight rows between supraoculars, five between suboculars and labials. Scales in 27 rows; color, light red or reddish-brown, marked with deep red spots; oval in front, diamond-shaped posteriorly, lateral, borders indistinct, separated in the middle line by a single row of yellow-tipped scales. Indefinite red spots in the lateral angles, head without markings except faint line from eye to mouth; tail white, with five black cross-bands.

*Crotalus horridus,* Linn (Plate IX, Fig. 2). The timber or banded rattlesnake. This is the common rattlesnake of the eastern temperate United States. It grows to an extreme length of five feet. The following is a brief description of a specimen in my own collection: Color, roll sulphur, a light yellow line from supraocular to angle of the mouth, back of which is a dark blotch. There is a series of chevron-like saddles on the back three to four scales wide, irregularly bordered with light yellow of one scale width, separated by three to five scales of ground color. Some of the bands are broken and form irregular blotches. The tail is black; the ends of the ventrals between the bands are strongly peppered with black; rattle, seven segments and a button. The marked features of the head are two large internasals followed by a row of five scales, the two external of which are much the larger; the supraoculars are large and ovoid. The rest of the head is covered by small granular scales. Body scales in 27 rows, mark-

edly keeled, except outer two rows, which are only faintly. A jet-black phase occurs. They are usually but not necessarily males. Distribution—Maine to, but not including, Florida.

*Crotalus confluentus,* Say (Plate X, Fig. 1). The prairie rattlesnake is the common rattlesnake of the Central United States, extending from Canada to Mexico. No. 7069, Academy collection, presents the following characters: Rostral high, in contact with prenasal; small plates behind nasals; three rows between supraoculars, four between suboculars and lips; top of muzzle covered with small scales, 27 rows of body scales; ventrals 182, subcaudals 23; color yellow; dorsal spots brown; concave before and behind; corners rounded slightly, convex on the sides; ten scales wide, four or five long, formation posteriorly tending to rings. These blotches are lighter in the center and are edged with light yellow. Two series of small alternating blotches on the sides, ventrals yellow; a brown oblique band beginning at the anterior corner of the eye, bordered by narrow white, extends to the angle of the jaw; a small vertical line below the pit and a faint one on the outer edge of the rostral. The supraoculars are crossed in the center by a white line which bifurcates internally the anterior arm, crossing to join the fellow of the opposite side

No. 10745 from Lake Valley, New Mexico, the *C. c. pulverulentus,* type of Cope, has six rows between the supraoculars, with a rather enlarged scale on its posterior inner border, and two symmetrically placed larger scales over the occiput; the color is lighter and more ashy than usually found; these slight differences are its claims for recognition.

*Crotalus oregonus,* Holbrook (Plate X, Fig. 2), Western rattlesnake, is identical with *Crotalus lucifer* of Baird & Girard. No. 7158, Holbrook's type, is so shriveled by alcohol as to be useless for description, so I have taken No. 16986, collected from the same locality. Color and spots like Confluentus, head scales slightly smaller, six rows between supraoculars, three between suboculars and upper labials. Scales in 25 rows; ventrals 170; subcaudals 21. The dark streak bordered by broad white on the side of head begins posterior to the center of the orbit and runs directly to the angle of the mouth, not dipping sharply downward as in Confluentus. The transverse supraocular line is distinct. Habitat—Pacific Coast region, California to British Columbia.

*Crotalus lepidus,* Kennicott (Plate XI, Fig. 1), smooth or green rattlesnake, is one of the smallest of the genus. The characters of No. 17921 are as follows: Color (blue-gray in alcohol), rich dark-green in life, crossed by 17 black bands extending just short of the ventrals; bands 2½ scales wide on dorsum, tapering gradually down the side; the bordering scales are half black and pale green, which gives the edge a serrated outline. Many of the body scales have black tips; the head is without marks. There is a double heart-shaped black blotch with light color between, on neck behind occiput. Tail brown. Rostral low, two preoculars, two loreals; two scales between suboculars and upper labials, ten between supraoculars. Body scales in 23 rows, external two smooth, all less carinated than usual. Ventrals 163, subcaudals 27; rattle, three joints and a button. Head more oval in shape and less distinct than other crotalus. No. 17903 has single crescent on nape of neck. Distribution—Neighborhood of Mexican boundary.

*Crotalus cerastus,* Hallowell (Plate XII, Fig. 1), the horned rattlesnake or sidewinder. No. 7097, small slender body, head distinct, rostral wide as high, head scales small, five rows between supraoculars, two between suboculars and labials. Nasal entire; the supraocular is elongated into a horn-like process directed upward and turned slightly inward on itself; body scales in 21 rows strongly and thickly keeled except outer two rows. Ventral, 145; subcaudals, 20; color, pale yellow, with an indistinct series of pale-brown dorsal blotches, and several rows of indefinite lateral spots. Habitat—Desert regions of southwest. When hurried, its mode of

progression is peculiar, moving away sideways, in this respect resembling several desert species of Old World vipers.

The following species I have not had the opportunity to examine, so will give only a condensed description of each from the type report:

*Crotalus mitchellii,* Cope (Plate XII, Fig. 2), commonly called white rattlesnake, from its pale coloration and indistinct dorsal markings. The rostral plate is separated from the anterior nasal by small scales, a condition not existing in any other member of the group. Distribution—Arizona and South California.

*Crotalus pricei,* Van Denburgh, described from specimens in the Leland Stanford University. Body scales in 21 rows, rostral higher than wide, enlarged plates on muzzle, one to three rows between supraoculars, one row between subocular and labial; color olive gray, thickly covered with small brown spots; small brown blotches in two series on the back, alternating anteriorly, forming cross-bands posteriorly; laterally two or three small alternating rows; ventrals slate-colored, with whitish ends; outer row of scales white; a dark-brown oblique streak behind the eye; two small brown spots on occiput. Distribution—Arizona to Mexico.

*Crotalus tigris,* Kennicott. Nose blunt, head oval, size small, rostral triangular, postnasal and preorbital short, one or two loreals, two or three scales below orbit, top of muzzle and interorbital space filled with small flat equal sized scales. Supraocular plate divided by a transverse groove, a branch from which more or less completely cuts off a part of the margin. Scales on cheek and back of head keeled. Color gray, with small dorsal blotches and an indistinct lateral series. On the posterior two-thirds of the body the spots form cross-bands. A dark oblique streak behind the eye; ventrals yellow. Habitat—Arizona, South Nevada, and South California.

*Crotalus willardii,* Meek (Plate XI, Fig. 2). Head long, muzzle narrow, somewhat recurved. Rostral higher than wide, nasal in contact with rostral, upper preocular not divided, internasal as long as wide; seven or eight scale rows between supraoculars, two between the eye and lip. Upper labials 14-13, lower 13-15. Body scales 25 rows, keeled, except outer two smooth; ventrals 153, anal single, subcaudals 28. Color, chocolate, dorsal markings, short, dark cross-bands, shading into a black line anteriorly or posteriorly, bars sometimes in pairs, and then separated by one or two scales; tail brown, with three distinct half rings, brown spots laterally of one to four scales; whole body more or less speckled. Ventrals white anteriorly, posteriorly small spots or blotches. A white median rostral line to lower jaw, expanding between two wide dark bars which extend half-way back on jaw; a white line borders second to fifth labials inclusive, continuing on to lower jaw. A light band extends obliquely from postnasals under eye to cover last four labials; below this across the pit a dark band spreading out on fourth or sixth lower labials. A prominent dark postocular streak about three scales wide, not bordered by white above.

The above is by Frank A. Hartman, U. S. Nat. Museum report.

### THE VENOM.

The first recorded reports on this subject were made over 200 years ago by a Charras and a Redi on the common viper of Europe and its poison. This was followed later by the able work of the Italian Felix Fontana, but as organic chemistry was in its infancy little could be accomplished.

Prince Lucien Bonaparte in 1843 first attempted a chemical analysis of viper poison, and stated it to be albuminoid or proteid in character. About twenty years later Dr. S. Weir Mitchell of Philadelphia, in a series of analyses of rattlesnake poison, confirmed Bonaparte's theory and called the substance crotaline, since which time all experiments made have proved the correctness of Dr. Mitchell's views.

The next important step was taken by Dr. Mitchell and E. T. Reichert in 1883, when they made a preliminary report, the final result of their experiments being pub-

lished by the Smithsonian Institute in 1886 under the title "Researches upon the Venoms of the Poisonous Serpents."

These investigations demonstrated the fact that crotalus and cobra poison was a complex substance consisting of several proteids, the two chief ones being named globulin and venom peptone.

At about the same time Dr. R. Norris Wolfenden, of England, was conducting a similar series of experiments on the venom of Indian cobra (*Naja tripudians*) and the Indian viper (*Daboia russelli*). His results confirmed the discoveries of Mitchell and Reichert. This substance he called syntonin, which is the same as Mitchell's venom peptone. Later studies by Dr. C. J. Martin and J. McGarvie Smith, of Sydney, Australia, on the Australian blacksnake (*Pseudechis porphyriacus*) proved this poison to contain three proteids, one a non-virulent albumin, and two poisonous albumoses.

In 1888 a Russian, Dr. E. A. Feoktistow, made a communication on the poison of several varieties of vipers and the *Crotalus durissus*, and its action on the nervous system, blood, and vessels. The same year a Frenchman, M. Kaufmann, reported on the *Vipera aspis* (the common viper of France), its poison, and the action on the nerves, circulation, and tissues, and the discovery of chemical antidotes to act locally on the poison. Both these investigations confirmed Mitchell's observations as to the difference between rapid and slow poisoning—*i.e.*, if injected directly into a vein there is rapid nervous, circulatory, respiratory, and digestive excitation, followed by drowsiness and death, the mental faculties being the last to be impaired; while hypodermic injection produces the same systemic effects, plus a local lesion, consisting of more or less swelling with marked discoloration due to extravasated blood and serum, death following promptly on the absorption of the poison. Mitchell and Reichert had found potassium permanganate, ferric chloride, iodine, and bromine were destructive locally to the poison, while Kaufmann advised chromic acid 1:100 solution as the best local treatment. Dr. Calmette first suggested chloride of gold to be used locally, but later indorsed chloride of lime solution 1:11. Dr. C. H. Yarrow favored pilocarpine and jaborine. So many drugs had their advocates.

In the Proceedings of the Royal Society for 1894, Sir J. Lauder Brunton, with Sir Joseph Fayer and Dr. Leonard Rodgers, reports a series of experiments (renewed after a lapse of thirty years), proving that the venom of the Indian cobra and Russell's viper is neutralized by potassium permanganate; also describing a lancet devised by Sir J. Lauder Brunton for use in the Indian army, consisting of a half-inch blade with a hollow screw-top handle to hold the crystals of the drug. Directions: Incise deeply the bite and *rub* in thoroughly the pure crystals.

Feoktistow and Müller had demonstrated that the poison was in part eliminated by the kidneys, while Dr. Konrad Alt showed there was slight elimination by the stomach. Meanwhile internal treatment had not made much progress. Ammonia had been proven valueless; alcohol dangerous, unless carefully and moderately given.

In 1871 Dr. Lanszweert, of San Francisco, Cal., reported five cases successfully treated with arsenate of strychnine. This method was then forgotten until 1888, when Dr. A. Mueller, of Yackandandah, Victoria, formulated and proved the success of the strychnine treatment in a large series of cases of poisoning by Australian snakes.

Preventive inoculation was first demonstrated in 1887 by Prof. Henry Sewall, of the University of Michigan. He reported a series of experiments on pigeons with the poison of the massasauga (*Sistrurus catenatus*), the conclusion being: "Repeated inoculations with a non-fatal dose produced increased resistance, without affecting the health of the animal."

It is well known that all poisonous snakes are immune to their own venom, as are also many harmless snakes poison-proof: for example, the common king snake, a member of the Ophibolus group, is immune to the poison of the rattlesnake. It has been shown that the blood of harmless immune

snakes, when injected into animals, produces all the symptoms of poisoning. Further investigation has proved this to be due to an internal secretion of the salivary gland of the harmless immune species. These experiments opened the way to producing immunity by giving attenuated doses of venom.

Dr. Calmette was the first to produce an anti-serum to protect against snake poison. He began by injecting rabbits with one-twentieth the fatal dose, gradually increasing the amount until he was able to give 80 times the fatal dose without reaction. Five drops of the serum of the immunized animals neutralized one milligramme of cobra poison. This serum will protect against the neurotoxic and hemolytic properties of other venoms, but not against the hemorrhagin of the rattlesnake. An antiserum for rattlesnake poison can be prepared by immunizing goats with attenuated rattlesnake poison. This serum will protect against hemorrhagin, but is valueless against the poison of the cobra.

The more recent work is that of Keyes and Sachs and Flexner and Noguchi. They have shown that the venom of different species varies greatly in its toxic properties, due to the relative amount of the different constituents. The formula of venom is as follows:

Neurotoxin.
Hemotoxin { Agglutinin. / Hemolypsin.
Hemorrhagin.

Cobra venom has neurotoxin in excess, with less hemotoxin, while the poison of the rattlesnake is chiefly hemorrhagin, with less neurotoxin and hemotoxin. The copperhead and moccasin are intermediate, the poison containing both hemorrhagin, hemotoxin, and neurotoxin in considerable quantities.

The action of the venom is briefly thus: Neurotoxin acts on the cells of the central nervous system, causing death by paralysis of the cardiac and respiratory centers. The hemotoxins, agglutinin and hemolypsin, destroy the blood cells. Hemorrhagin acts directly on the endothelial lining of the blood-vessels and causes its destruction.

The latest comprehensive work on the subject is by Noguchi, issued by the Carnegie Institute in 1909, to which I would refer all interested in this topic.

### TREATMENT.

We will only consider this subject as it applies to bites received in the United States:

1. Do not lose your head. Death from snake bite is extremely rare in this country, so much so that if a man is bitten in Texas it will form a heading in the Philadelphia papers. Remember that most so-called poisonous snakes are harmless, also that the poisonous varieties are now usually found far remote from civilization in thickly wooded, barren, rocky desert, or in the low-lying coastal regions of the South. More than two punctures at the seat of injury would be a strong indication that the wound was innocent. Always, if possible, keep the head of the snake for identification, and so save future worry.

2. If, as is generally the case, the bite is on an extremity, tie one or more ligatures, preferably a broad rubber band, above the injury to prevent the poison gaining entrance to the general circulation.

3. Incise deeply the wound, cutting across the puncture for at least one inch, and well beyond the depth made by the fang. Now wash in running water, manipulating the part to promote free bleeding.

If running water is not available, suck the wound, as there is no danger in taking the poison into the mouth unless some break in the mucous membrane exists. The mouth should be thoroughly rinsed with potassium permanganate solution.

4. Now wash well the wound and use in and around the potassium permanganate, or inject a chromic acid solution 1:100, being careful to completely infiltrate not only the wound but also the surrounding tissues.

5. Do not give ammonia. Stimulate with *small* doses of whisky, if indicated, but do not overdose, as more persons have been killed by giving large quantities of whisky than by snake bite.

6. Rush the case to a good surgeon.

7. When positively certain that the poison has been removed from the wound, loosen cautiously the ligatures, the one nearest the heart first, but do not remove, so they may be again tightened if symptoms recur. In all cases the victim should have the best surgical care, and the wound kept open by packing with wet antiseptic gauze, as sepsis and local gangrene is very apt to follow the injury.

This article was not written for the specialist, but to help the medical layman in the identification of dangerous snakes, so I have purposely in my drawings from nature made them semidiagrammatic.

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## SCARLET RED FOR GRANULATION.[1]

BY DR. S. B. KOSITCHEK,
Assistant of Dr. Carl Beck, of North Chicago Hospital Clinic.

Shortly after Schmieden had made the report of this work with scarlet red, it was taken up in the clinic of Dr. C. Beck, at the North Chicago Hospital, in order to ascertain if similar results could be obtained.

Dusting powders, salves, cautery, in fact all known means of promoting fresh granulations, and the production of epidermatization had been tried, some with good, others with little, and still others with no benefits.

Before making any trials with scarlet red on our patients, an attempt was made experimentally to prove that it causes a proliferation of epithelial cells.

This was done by taking 1 part scarlet red powder to 3 parts of olive oil, and injecting this solution hypodermically into the ear of a rabbit (Dr. Moore and Newmann). About one week after injection a tumor was seen on the ear of the rabbit, about the size of a pea. (This can be seen in the accompanying photograph.) Three weeks after injection this growth was removed, and upon sectioning it, was found to be made up of epithelial cells.

Among the first cases upon whom we tried the scarlet red were the following:

*Case 1.*—H. G., aged eight; nationality, Russian. Was brought to the North Chicago Hospital suffering from a severe tertiary burn, involving the left side of the neck, chest, axilla, and under surface of arm. So severe was the condition of the child that for several weeks his life hung in the balance.

The first dressing applied was the scarlet red salve made up with vaselin and scarlet red 5 per cent, and applied thickly over the burn; this was covered over with gauze and cotton. So healthy did this keep the granulations, and so rapid was the epidermatization along the borders, that no other local treatment was given, so that when the time came to place our skin grafts the surface to

be covered was about one-half the original size. Most of the grafts did not "take," so the scarlet red salve application was continued. At the present time the whole surface is healed over.

Since the treatment of this case with the scarlet red we have treated other cases of burns in a similar manner, with similar success.

[1]Read before the German Medical Society, Chicago, Ill., May 4, 1911.

*Case 2.*—This demonstrates the value of the scarlet red in postoperative treatment of cases in which the old methods were tried without benefit. Mr. J. F., operated upon by Dr. C. Beck, for the removal of a malignant growth in the axilla which had spread to such an extent that it was only by the most radical operation (removal of arm and entire shoulder girdle) that healthy tissues could be reached.

The nutrition of the large semicircular flap was not good, a large portion of its edge sloughing off, leaving a surface about four inches wide uncovered. Adhesive strip and secondary sutures failed to draw the flap and skin of the chest wall close enough to allow union to take place, so these attempts were given up and scarlet red used to freshen the granulations and promote the healing by secondary intention. In a remarkably short time this patient was presented before a well-known medical society, with wound entirely healed.

*Case 3.*—Thigh amputation, with gangrene and sloughing of flaps, entirely healed through the use of the scarlet red salve as a dressing.

These cases serve to illustrate the type of patients upon whom we have used the salve.

Recently we have been using a 5-per-cent ointment of scarlet red as furnished by the Department of Experimental Medicine of Parke, Davis & Co., and with the same results as above noted.

Through the results in these and other cases scarlet red has earned a permanent place in the dressing basket at the North Chicago Hospital.

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## ENURESIS AND THYROID EXTRACT.

In the *Lancet* of December 9, 1911, FIRTH in discussing this subject says that the cases which appear to react to this form of treatment better than all others are those in which the enuresis has persisted since birth, and in which the patients are also backward. He had five of these cases, all of which showed marked improvement. Seven cases with enuresis from birth were stated to be quite satisfactory as to the mental condition, and only one of these improved. Of the sixteen cases in which the enuresis started during childhood, six out of the ten improved were backward compared with two out of six not improved. The duration of the acquired enuresis was of no importance in prognosis.

In seven cases in one group hypertrophy of tonsils and adenoids was present, and four had undergone operation for this condition. In another group four children were similarly affected, and one child had had them removed. In no case could any connection be traced between operation and enuresis. In no case could the enuresis be ascribed to the genitalia, whilst threadworms had been noticed in three cases of those improving and in two cases amongst those who received no benefit by treatment. In three cases the enuresis could be traced to a definite exciting cause—an operation for hernia, scarlet fever, and enteric fever respectively. The first of the cases was cured, but the other two did not respond really well to the treatment.

An attempt was made to obtain data for controlling the effects of the thyroid extract from observations on the pulse, temperature, and weight. The pulse-rate did not give any definite evidence of overdose until diarrhea commenced, and showed wide variations in uncomplicated cases. Had the children been under observation in hospital where the pulse could have been recorded twice daily, thyroidism would probably have been detected by the increased pulse-rate before the onset of diarrhea made it obvious, but a weekly attendance and the likelihood that the accompanying excitement will disturb the pulse-rate seem to render the pulse an untrustworthy guide, and to explain the difference noticed for which no definite cause could be otherwise assigned.

The temperatures were taken in the rectum and varied between 98° and 100° F. before treatment commenced; all cases except five showed an average rise of about 1° while under treatment, but there was no distinctive feature about the behavior of the temperature in any group.

# EDITORIAL.

## INTRAVENOUS INJECTIONS TO BE USED WITH CARE.

It is now many years since we first called attention to the value of intravenous injections of normal saline solution for the purpose of combating certain conditions which are commonly met with by physicians and surgeons. Three or four years ago we also called attention to the necessity of exercising care as to the exact saline content of the liquid injected, and quoted Matthews's investigations, which served to emphasize this point. Twenty-six years ago a series of investigations were carried out in Ludwig's laboratory at Leipzig which had a direct bearing upon this same subject.

There can be no doubt whatever that the importance of this matter is not as fully recognized as it should be. Not infrequently the preparation of the saline solution is left entirely to a comparatively untrained nurse, and the working formula which is given her is by no means an accurate one. Indeed, it is a common practice, we believe, to direct that a teaspoonful of common salt should be added to a pint of water—a teaspoonful being a very uncertain quantity and the salt being rarely, if ever, sterilized before it is dissolved. We have repeatedly called attention to the advisability of employing Locke's modification of Ringer's solution for this purpose. There is no justification in the employment of the rough-and-ready salt solution to which we have already referred, since Locke's modification of Ringer's fluid can now be obtained in the form of "concentrated sterile saline," or in the form of sterile salts, which when added to a liter of water provides not only a salt solution of 0.9 per cent, but also gives the physician a solution in which the normal saline ingredients of the blood are present in the proper proportions.

Our attention has been called to this important matter not only by clinical experience, but by two papers which have appeared, practically simultaneously, in this country and abroad. In the *British Medical Journal* of December 16, 1911, Hort and Penfold give us the results which they have obtained from a research carried out in the Lister Institute. Although their investigations were chiefly made upon animals, many of their points have a direct bearing upon the use of saline solutions in human beings, and much literature is quoted concerning this important matter.

It is well known to physiologists that when a saline solution which is less than 0.9 per cent is injected into the body of a human being, its hypotonic properties cause the osmosis of the salts of the body until the fluid injected is isotonic with the tissues; and, on the other hand, if a solution greater than 0.9 per cent is injected, this solution abstracts fluids from the tissues until the two liquids are isotonic. Any considerable variation in the tonicity of the fluid is capable of producing very serious functional and organic changes in different organs of the body.

Hort and Penfold call attention to the fact that fever, rigors, subnormal temperature, intestinal hemorrhage, Cheyne-Stokes breathing, convulsions, and even sudden death have followed intravenous injections, although the last two accidents have only ensued when solutions which were strongly hypertonic were used. These symptoms can readily be produced in animals by the use of such solutions. These writers also quote Fischer and Bingel as having recorded the onset of glycosuria after intravenous saline injection, and Raum found that normal saline caused vacuolation of the liver cells. Allbrecht found that the red cells of animals were damaged by large injections of normal saline, and Rössle noted degenerative changes in the heart muscle and capillary walls of animals so injected. Hössli also found fatty changes in the heart-muscle and kidneys following saline infusion.

The investigations of Hort and Penfold would seem to indicate that the fever is not

so much due to the injection of a saline solution which is of an improper strength as it is due to the presence of microörganisms in the distilled water which is supposed to be sterile, and they call attention to a paper of Wechselmann, who noted that, when saline solutions were given intravenously for the purpose of administering salvarsan, the symptoms which sometimes followed were apparently due to such infection rather than to the drug, the salt, or the water. Thus, he found that the water employed gave a luxuriant growth of a Gram-staining, spore-bearing bacillus, although it was supposed to be sterile distilled water. Hort and Penfold reach conclusions which are practically identical. They even found a far larger number of microörganisms in the water than did Wechselmann. The necessity of seeing to it, therefore, that the water is sterilized immediately before it is used, even if it be distilled water which has been kept with ordinary precautions, is manifest. In some instances, too, it would seem probable that when the water is boiled and fever follows its injection, this symptom results not from the presence of living microörganisms but from soluble products directly or indirectly due to the previous existence of bacteria.

The second paper which has attracted our attention to this matter is contributed by Evans to the *Journal of the American Medical Association* of December 30, 1911, and is more clinical in its nature. As Evans well points out, very large quantities of fluid cannot be injected, even if their concentration be normal, without throwing a very heavy burden upon the kidneys and perhaps also upon the heart; although we cannot help feeling that before the heart is materially damaged by such injections the quantity must be enormous. Evans records two cases in which the abuse of saline solutions, either by the rectum or subcutaneously, resulted in alarming symptoms in one instance and death in another.

The lesson to be learned from these papers and from clinical experience is the old one that any remedial measure capable of doing good is, if abused, capable of harm. Saline injections, properly prepared, of proper strength, and sterile, can be used within certain limits with great advantage and are often life-saving agents. Rogers has proved in cholera that hypertonic solutions are advantageous because in this disease anything which will diminish the amount of fluid which is poured out from the body, theoretically and practically, is advantageous. Care should be taken always, except in cholera, that, for use in human beings, the saline solution is neither weaker nor stronger than 0.9 per cent.

## ENLARGED GLANDS OF THE NECK.

Some months ago we considered in the editorial columns of the GAZETTE the treatment of enlarged glands of the neck, the most important point made being that many of these enlargements should be treated surgically, and, furthermore, that the rapid disappearance of markedly enlarged glands was probably indicative of their having undergone suppuration and rupture into the surrounding tissues rather than that skilful treatment had resulted in their being dispersed. In other words, just as sudden relief from pain in appendicitis is indicative, in most instances, of increased gravity rather than recovery, so does the sudden appearance of a fluctuating mass in the neck indicate immediate interference, although on examination by the eye the mass seems to some extent, at least, to have returned to its normal size.

Our attention has been called to this matter once again by an interesting contribution of Dr. Hale-White to the *Clinical Journal* of January 3, 1912, in which he discusses not only the treatment of enlarged cervical glands or lymph nodes, but also mentions a number of interesting etiological and diagnostic points which have considerable bearing upon the management of this condition. Thus, he points out that occasionally in children and adults there is enlargement of the glands at the back of the neck because of the presence of pediculi in

the hair. This enlargement is not only sufficient to be felt, but to be actually seen. Of course, the therapeutics of such a case is connected with the destruction of the parasite and not with local treatment of the glands or internal medication. So, too, it not infrequently happens that the glands under the jaw are enlarged when the patient is suffering from disease of the teeth, and sore throat in its various forms, diphtheria, and septic conditions of the mouth may all produce great enlargement of the glands in this neighborhood, one of the most frequent causes being an infectious tonsillitis. It is always wise in making a diagnosis of the cause of enlarged glands to follow the tributary lymphatics to their peripheral endings, and to seek at these endings for some local cause. Thus, Hale-White cites an instance in which a woman suffering from unilateral enlargement of the axillary glands, for which no cause was manifest, was found to have been leeched on the chest, that the leech bites had become inflamed and the glands secondarily enlarged.

So far as the more grave causes of glandular enlargement are concerned we may cite malignant disease and tuberculosis, although malignant disease rarely affects the cervical lymph nodes until late in the malady, unless we include Hodgkin's disease in the list of malignant neoplasms. When malignant disease affects tissues about the mouth or tonsils, secondary enlargement of the cervical glands may speedily develop. It is interesting to note, too, that not infrequently in malignant disease of the abdominal viscera there is found an enlarged gland just above the left clavicle; this enlargement ensuing because the thoracic duct carries the disease upward. If there are enlarged glands above the clavicle, this gland is probably due to the same cause, but if found alone it should attract attention to disease below the diaphragm. If there is reason to believe that the enlarged glands are tubercular in nature, it is probably best, in the vast majority of instances, that they be carefully dissected out, the greatest possible precaution being taken that little damage is done to surrounding parts and that no blood-vessels are incised until they have been carefully tied.

Concerning the use of tuberculin as a curative agent for tuberculosis of the cervical lymph glands, we notice with interest Hale-White's statement to the effect that tuberculin is not a reliable agent for this purpose, even if tubercle bacilli have been actually found in an excised gland. Where there is reason to believe that the enlargement of the glands is due to disease of the tonsils, it is practically useless to remove these bodies by means of the guillotine, since the remaining portion of the gland is also infected and the source of disease is only partly removed, while, at the same time, numerous avenues for the entrance of further infection are opened.

Concerning the value of the von Pirquet, or other tuberculin, tests to determine if the enlarged glands are tuberculous in nature, we can only conclude that even if the reaction is positive, this proves but little, as tuberculosis in other portions of the body, or an old, healed, tuberculous lesion, may give the reaction and lead to the erroneous deduction that the focus of tuberculous infection is in the neck. Hale-White quotes 130 cases of enlarged glands in which the tonsils were dissected out, and no tuberculin was used, of which 101 were cured, and 51 consecutive cases in which tuberculin was given in addition to tonsillar dissection, of which 32 were cured. Although these statistics are limited as to numbers, they certainly indicate, as far as they go, that the tuberculin was not advantageous.

Tuberculous glands, while usually slow in development, occasionally are very acute in the onset of their swelling, and the physician must not rely upon an acute onset as indicative of an origin far removed from tuberculosis. If there has been a general tuberculous infection, there may be many lymph nodes in other portions of the body distinctly enlarged. In this connection, too, the glandular fever of childhood is not to be forgotten, nor is lymphatic leukemia or Hodgkin's disease to be ignored in making

the diagnosis, but in lymphatic leukemia the enormous increase of lymphocytes in the blood makes a diagnosis clear. In all these conditions a very distinct and sometimes a sharp febrile movement may be present.

There is little use in operating upon glands which are enlarged as the result of lymphatic leukemia or Hodgkin's disease. Indeed, operative interference may be distinctly harmful, and unfortunately there is no medical treatment which is curative in either malady.

When glands are enlarged as the result of various forms of infection, the use of iron, quinine, fresh air, and sunshine is without doubt useful, and vaccine therapy is not to be forgotten. The iodide of iron seems to be the remedy among the iron preparations which is calculated to give the best results.

## THE TREATMENT OF EMPYEMA.

Although croupous pneumonia in children is, when free from complications, very rarely fatal in distinction from catarrhal pneumonia, which, in this class of patients, has a high mortality, yet it not infrequently results in the death of the patient by reason of some sequel to the primary illness, of which the most common is empyema. This sequel is also by no means rarely met with in adults, and empyema not only occurs as a result of infection by the pneumococcus, but because of the presence of a number of other organisms which are pyogenic in character.

The question as to the method of treatment which should be instituted depends, in some degree, upon the pus-producing organism which is responsible for the condition. In all cases it goes without saying that the old-time rule, "wherever there is pus let it out," holds true. In children suffering from pneumococcic empyema which has not been of very long duration, an intercostal incision is, in our experience, usually sufficient not only to cause exit of the pus, but also, if drainage is maintained, to result in recovery, although we are well aware of the fact that the majority of surgeons believe that in practically every case of empyema, whether it be in the child or in the adult, it is wise to resect the rib. It is quite true that the operation of resection of a rib is, as a rule, by no means difficult; but it is exceedingly painful to the patient, so that it often, if not always, requires the administration of an anesthetic, which may be distinctly advantageous in view of the high intrathoracic pressure produced by the effusion and the displacement of the heart which is usually present.

Much depends, of course, upon the changes which have taken place in the chest wall. When, by reason of a pleuritis which has been present for a long time, the edges of the ribs are brought in close approximation, or even overlap one another, it is manifest that an incision is not sufficient, since the overlapping ribs will prevent drainage through the opening, and so compress any drainage-tube which may be introduced as to occlude it. There can be no doubt that there is need for excision of a rib, to provide free drainage, in all cases of empyema except that which is due to the pneumococcus in children. The point of importance is that the drainage must be free, be the cause what it may.

An interesting series of papers upon this subject has been contributed to the *Providence Medical Journal* for November, 1911, by Elliott, Cooke and Wilson, and we are glad to note that Wilson calls attention to the fact that paracentesis *with drainage* is often sufficient. It is our belief also that where the effusion is a large one and the displacement of the heart and other viscera is great, the proper procedure is to withdraw the pus by aspiration, in order that the intrathoracic pressure may not be suddenly relieved, with the result that great changes in the position and action of the heart ensue. After the greater part of the pus has been evacuated in this manner, the further operation of incision and, if need be, excision of the rib can be performed; all these procedures taking place at one sitting, and none of them, save that of excision,

requiring the use of an anesthetic. In those instances in which drainage, and gradual expansion of the lung by proper pulmonary exercises, is not followed by recovery, it is not to be forgotten that the best method of treatment is by the injection of bismuth paste, which may be resorted to with excellent results in some cases.

As much fresh air and sunshine, with good feeding, as it is possible to obtain are absolutely essential. In these modern days, when so much attention is devoted to the destruction of microörganisms by active measures on the part of the physician, we are sometimes prone to pay too little attention to the methods of our forefathers, who were forced to rely more than we are upon the vital resistance of the individual in producing a cure, and who therefore recognized the value of sunshine, fresh air, and good food with ferruginous tonics more fully than many of their successors.

It is unfortunate that many cases of empyema are not discovered as early as they should be, and no measures for their relief are instituted until great changes in the lungs and pleura and in the position of the thoracic viscera have occurred.

It has been suggested by some clinicians that urotropin might be given freely during the course of pneumonia with the hope that it would be eliminated into the pleural effusion and so tend to prevent pleural infection. So far as we know no statistics have been published which would indicate that this theoretical advantage actually ensues, and we cannot help feeling that the pathological condition which exists in the pleura militates against the usefulness of this procedure just as it prevents the absorption of a serous effusion taking place as a result of purgation. In both instances the treatment fails because, very early in the inflammatory process, the pleural surface becomes covered with the fibrinous exudate, which seals the stomata of the lymphatics and closes the smaller blood-vessels, virtually plastering the layers of the pleura with an exudate through which the educts of urotropin cannot be poured out and through which a serous effusion cannot be absorbed.

## THE CURE OF ASCITES DUE TO LIVER CIRRHOSIS.

Talma's operation designed for the purpose of establishing collateral circulation, and thus preventing the persistence and recurrence of the ascites due to hepatic cirrhosis, has been practiced many times, with greatly varying technique, with results which in so far as reported cases are concerned are fairly satisfactory; but these are based in the main on selected cases and on those reported at a comparatively early period after surgical intervention. Koslowsky reports 45 per cent of cures of 168 cases; Greenough 42 per cent in 105 cases; Monprofit 70 per cent in 224 operations, of which 35 per cent were permanent. Wheeler and Bunge regard icterus as a contraindication. This, however, is not generally accepted, it being held that after drainage of the bile the Talma operation is distinctly indicated, providing the venous obstruction still persists. A profoundly depressed vitality is, however, generally recognized as a contraindication, as is pronounced atrophy of the liver, as shown by bile in the urine and its absence or diminution in the feces. Bunge considers a diminished excretion of urea, increased output of ammonia, and the presence of levulose in the urine as at least serious contraindications.

As generally performed, the belly is opened by a high midline incision; the omentum is sutured either just without the peritoneum or beneath the skin. The ascitic fluid is thoroughly drained out, and continuous drainage may or may not be practiced for several days. As a variation of this procedure the omentum may be fixed between the liver and the diaphragm. The collateral circulation may be further provided for by a rough scraping of the liver, spleen, omentum, and intestines, thus encouraging parietal adhesions. As a further modification the spleen may be brought out through an incision along the costal margin and either entirely or partially fixed in a pouch between the parietal peritoneum and muscles.

Morison (*British Medical Journal*, Jan. 20, 1912) notes that the operation was sug-

gested to him by a post-mortem upon a man dead of cirrhosis of the liver, having no ascites because the collateral circulation, chiefly through the enlarged veins of Sappey, had relieved the portal obstruction. Morison believes that the most suitable cases are those of alcoholic cirrhosis in patients otherwise sound and in whom repeated tappings have failed to cure. None of such cases have been failures in his hands. Cases he has operated upon with ascites due to syphilitic cirrhosis have not been cured. The most unfavorable cases are those which at their commencement simulate an abdominal emergency and suffer from intense pain and tympanites preceding the development of ascites. The great danger from the standpoint of operation appears to be the development of a condition related to acute yellow atrophy, so that some other anesthetic than chloroform should be chosen. The abdominal incision should be made above the umbilicus, from the ensiform to this structure. The hand is introduced into the abdomen and the fingers projected against the anterior parietes of the middle line three inches above the pubis. A small incision is made on the finger-tip, and through this is introduced a long, small, glass drainage-tube into the rectovesical or rectouterine pouch. The abdominal cavity is dried and the peritoneum is scrubbed with mops. The omentum is sutured to the anterior parietal peritoneum across the abdominal wall, and the upper abdominal wound is closed. An antiseptic dressing is applied over the wound and tube, and over this, from above down to the tube, a series of long circular strips of adhesive strapping. The tube now exposed through the dressings is surrounded with a sheet of dental rubber perforated to grasp it below the collar on it, and the separated tube dressing is wrapped up in the india-rubber sheet. The nurse pumps off the fluid sufficiently frequent to keep the dressings dry. These should be changed in ten days, after which a small india-rubber tube can be made to take the place of the glass one. As a rule the wounds are entirely healed in one month and no further accumulation of fluid occurs. It need, however, occasion no serious disappointment if the fluid reaccumulates, since some of the most successful cases required tapping several times after the recovery from the operation. Successful cases are reported several years after operation.

## CHOLECYSTITIS.

The collected papers on this subject, by Bayard Holmes on "The Symptomatology and Diagnosis of Toxic (Non-Infectious) Cholecystitis," by Richter on the "Pathology of Cholecystitis and Its Complications," by Engelbach on the "Medical Treatment of Cholecystitis," and by Frank on the "Surgical Treatment of Cholecystitis," constitute a most instructive and contrasting study. As to the pathology, Richter briefly disposes of this on the generally accepted principles, particularly insisting upon the fact that the term cholecystitis and gall-stones should not be used interchangeably, stone formation following infection and representing an end result. Holmes regards the gall-bladder as the most passive of the three divisions of the biliary tract. These three natural divisions are the anastomosing bile ducts extending from each secreting liver cell to the duodenum; the vasa aberrantia or redundant bile ducts ramifying in the capsule of the liver the ligaments of the liver and the under face of the diaphragm; and the gall-bladder and its duct. From the pathological and clinical standpoint the gall-bladder and its duct are the most important of these three.

At the present time a few conditions only that affect the bile ducts and the vasa aberrantia and the cystic duct and gall-bladder have obtained clinical recognition. From the clinical standpoint any disease of the gall-bladder which gives rise to distinguishable symptoms is a cholecystitis. It may be a part of some other dominant disease such as typhoid or may be residual to such a condition, and at the time of observation the only morbid process in existence. It presents itself in three quite distinct clinical pictures with closely related pathological findings: First, cholecystitis, often called

empyema of the bladder, attended by chills, fever, and pain, representing infection plus obstruction. The second form is termed calculous cholecystitis; it may or may not be accompanied by infection. The third form is toxic, probably non-infectious, the symptomatology of which is based on 46 cases, of which 32 were operated on for drainage of the gall-bladder. The cases have all shown slight icterus and no bile pigment in the urine. Riedal's lobe is usually demonstrable, the gall-bladder palpable beyond this lobe, varying in size from day to day and tender. The liver is usually enlarged, especially the left lobe. The patients are usually in the fifth and sixth decades of life. There is a slight increase in leucocytes, high blood-pressure and cardiac disturbance, tachycardia, arrhythmia, and "missing of a beat." Indeed, the latter symptoms were usually those which brought the patient to the medical man. Most patients present Ewald's area of hyperesthesia in the most unmistakable manner. One patient had an attack of herpes zoster covering this area and extending from the spine to the sternum; three other patients complained of neuralgia in the ninth nerve on the right side. Metabolic studies were negative. There was usually complaint of gastric disturbance, distress after eating, eructations of gas. A large number of patients felt anxiety and depression from jumping of the heart, a number were hypochondriacal. Every gall-bladder was found at the operation to be thick, white, and filled with tarry or porridge-like material which proved sterile. There was a crystalline precipitate, cholesterin, and nearly all furnished calculi. Most of the gall-bladders were two or three times as large as normal. The operative results were excellent.

Holmes is convinced that there is a morbid process which is initiated by some irritant in the mucosa of the gall-bladder, which results in an enormous multiplication of mucous glands in this viscus; that this results in the secretion and excretion of toxic materials into the gall-bladder by these glands, which toxic materials are so absorbed by the tissues of the patient as to result in a general toxemia, and that this toxemia produces a train of symptoms which have been briefly outlined above. The reason these symptoms are produced rests upon a selective action of these toxins upon the heart and the centrally located blood-vessels, and upon the nerves which are cognate with those that supply the gall-bladder through the sympathetic plexus.

Engelbach believes that treatment based upon infection, plus obstruction, is now considered the more rational. He holds that the consensus of medical opinion has unreservedly established the surgical treatment for chronic cholecystitis. Undoubtedly there are exceptional cases which take place in any chronic inflammation. In these cases the mucous membrane atrophies, the cicatrized gall-bladder contracts down; if calculi are present they are immobilized in a small, almost obliterated gall-bladder. These changes toward latency or quiescence of this disease are the rarest exception, and should not be anticipated in any given case. Acute cholecystitis is regarded as a much more frequent complication during the course of typhoid fever than is suspected, this local infection being probably the most frequent cause of prolonging the disease more than three weeks. Many of these cases not accompanied by local cystic duct obstruction produce no local physical findings. An attempt has been made to determine the value of various drugs and vaccines in preventing cholecystitis as a complication of typhoid fever. Calomel, salicylic acid, oil of turpentine are regarded as entirely inert. Menthol and hippole are considered as having the strongest antiseptic action, urotropin being serviceable only when given in very large doses. Typhoid vaccines furnished by the experimental department of Parke, Davis & Co. are still *sub judice*.

Holmes believes that medical treatment is indicated and should be carried out for the purpose of curing the incipient mucous membrane infections of the bladder in those inflammations of the gall-bladder complicating known diseases, such as typhoid. It should be carried out with the purpose of

curing the incipient mucous membrane infections of the bladder before this becomes extensive enough to produce obstruction of the cystic duct, calculi, or involve tissue beyond this membrane. That gall-bladder antiseptics, such as urotropin and menthol, combined with vaccine, preferably specific vaccine, probably offer the most promise for further observations upon the prophylactic and active treatment of acute cholecystitis.

Frank regards drainage as a *sine qua non* in the treatment of gall-bladder infections. Without subsequent drainage, even though the stones be removed, though adhesions be broken up and the structures entirely freed, complete and perfect recovery will not take place.

Moreover, the drainage to be effective should be prolonged or should be continued until the discharged bile is free from bacteria. He considers that it should be maintained for two to six weeks or even longer. Cholecystectomy is to be reserved only for the exceptional case.

Perhaps the contribution of most importance in this symposium is that of Holmes on what he calls toxic cholecystitis, meaning by this term an inflammation in the products of which bacteria cannot be demonstrated, accentuating especially cardiac symptoms arising therefrom, and attributing this to the toxic absorption of products engendered by newly developed mucous glands in the gall-bladder.

## REPORTS ON THERAPEUTIC PROGRESS.

### POISONING BY ACETYL SALICYLIC ACID.

KIRKMAN reports his own case in the *British Medical Journal* of November 25, 1911. As he well says, toxic symptoms due to this drug must be rare, since enormous quantities are now taken by the laity without doctors' prescriptions, apart from the frequency with which it is ordered by the profession.

During the hot weather the author states he is a constant sufferer from severe headaches, and has on many occasions taken doses of 10 grains of aspirin, and on one or two occasions 15 grains, without ill effects. On a very hot day last summer he was to play in a tennis match during the afternoon, and, having a headache, took two 5-grain tablets at 3 P.M. At 3.45 P.M. he started playing in the hot sun. After playing two or three games he felt his hands, arms, and feet tingling, his head felt "full," and he had a slight tendency to retch. He finished the "set," which only lasted fifteen minutes, and which ended disastrously to his partner and himself; and without waiting to explain a hasty retreat, jumped on a bicycle and rode home, which was only a few hundred yards distant. On reaching the house he had a burning sensation over the entire body. On looking in the glass he saw his face was very swollen, with lips double the normal size, conjunctivæ suffused, and eyelids puffy. His whole body was covered with a profuse urticarial rash, his fingers, toes, and other parts being very swollen. His pulse was rapid, and out of curiosity he kept a finger on it for some time. After lying on the bed some ten minutes, it had become so rapid and running that he could not count it, and feeling anxious about himself (there was only a colored domestic in the house at the time), he staggered down to the surgery, poured out a dose of liq. strych. min. x, and drank it. Whilst the glass was at his lips he fell unconscious on the dispensing counter, scattering bottles, etc., in all directions, but must have almost immediately recovered consciousness. He managed to drag himself slowly back to the bedroom, where he remained until his wife, who had been out, returned at 6 P.M. His whole body was still swollen and covered with the rash, the face and lips being enormously puffy. The pulse had fallen to 130. Next morning the rash had gone, but his face was still slightly swollen, and the pulse was quicker than

normal. During the day he felt ill, and was unable to do his work until the evening.

On many occasions since this experience he has taken aspirin, but is careful only to take it when it is possible to rest for an hour or two afterward. This experience should make certain of our colleagues who are in the habit of promiscuously prescribing 15-grain doses of aspirin careful in selecting their cases and in advising their patients to remain quiet after dosage. [We do not think that there is adequate proof that the aspirin was responsible for the symptoms.—ED.]

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### SYPHILIS RELAPSES UNDER MERCURIAL AND SALVARSAN TREATMENT RESPECTIVELY.

In the *Journal of the Royal Army Medical Corps* for December, 1911, HARRISON writes on this theme. He believes that in untreated cases of syphilis and those under mercurial treatment, the character of the symptoms is generally in accordance with the time which has elapsed since the primary sore made its first appearance. The intervals between the successive stages may be lengthened by mercurial treatment, but, speaking generally, early symptoms are not repeated. Thus primary sores do not recur two months or longer after they have healed, nor do early secondary rashes return in any high proportion three months or longer after they have disappeared.

With salvarsan-treated cases, the experience at the Military Hospital, Rochester Row, has been different from this. Of the cases suffering from primary sore only, which were treated with salvarsan, active signs returned in five after intervals of two and a half to ten and a half months, and in four of these the only sign of the relapse was the chancre, which recurred two and a half, two and a half, ten and a half, and three and a half months respectively after first healing. Out of eleven cases which suffered from early secondary rash when they first came under treatment and subsequently relapsed, in eight the same rash returned, twelve, four, three, ten, seven, seven, four, and seven months respectively after it had first disappeared. One of these cases was instructive in this respect: he was first treated with salvarsan for roseola, sore throat, and synovitis, all of which rapidly disappeared after the injection. Subsequently he suffered from two relapses, which occurred three and six months respectively after the first injection, and on each of these occasions all the above symptoms returned.

The sequence of events in syphilis, which has been roughly divided into primary, secondary, and tertiary syphilis, and parasyphilis, is capable of two explanations: (1) That the spirochæta pallida undergoes a series of changes when resident in the tissues, and that in each of these successive phases the symptoms to which it can give rise are peculiar to the stage at which it has arrived. (2) That it is the tissues which change, so that the longer the spirochæta acts on them, the more the lesions which result from any increased activity of this parasite approach, first, the characters peculiar to the so-called secondary, and then those of the tertiary stage.

The first explanation would be difficult to prove, and against it is the fact that infection with spirochætæ derived from a secondary or tertiary lesion results in a primary sore. In favor of the second explanation is the well-known fact that in the majority of cases of syphilis, whether untreated or treated with mercury, reinoculation does not result in the production of a second chancre. As Queyrat showed, this refractory behavior of the skin and mucous membranes to infection from without is gradually developed during the ten days which succeed the appearance of the primary sore; as the end of this period approaches the sore resulting from reinoculation becomes more and more evanescent till, finally, no chancre follows. Finger and Landsteiner succeeded in producing skin lesions in such cases by inserting large amounts of syphilitic virus in pockets under the epidermis; these were not chancres, however, but simulated the lesions from

which the patient was suffering at the time. Thus in the secondary stage a papule followed the inoculation, while in patients suffering from gummata or ulcerating syphilides identical lesions formed at the sites of inoculation. That these were due to the newly introduced spirochætæ, and not to those already infecting the patients, was shown by the fact that if the former were previously killed the result of the inoculation was negative.

The evidence is, therefore, strongly in favor of the theory that it is the length of time during which the spirochætæ have acted on the tissues which determines the characters of the successive manifestations of syphilis.

If we accept this view, the nature of the above-mentioned relapses in cases treated with salvarsan only indicates that from the date of the last injection till shortly before the appearance of the clinical symptoms the spirochætæ had not been active in the majority of cases. This is supported by the fact that in most of these the Wassermann reaction had returned to positive only three or four weeks before clinical symptoms returned, and it shows that, unlike the case with the great majority of patients who are treated with mercury, the latency was not apparent only, but real. It remains to be seen whether cases which relapse clinically many months after the Wassermann reaction has returned to positive will have symptoms of a later type than those for which they were first treated; since the Wassermann reaction, as ordinarily elicited, is not an index of immunity, but closely accords with the activity of the parasites, it is to be expected that they will.

Further evidence of the superiority of salvarsan over mercury in its action on the S. pallida is afforded by the cases of reinfection which have been recorded; one undoubted case of this kind has occurred at Rochester Row.

From the above it would appear:

1. That salvarsan has a more intensely specific action than mercury.

2. That, even if a relapse does occur, as the patient's tissues have been free from the action of the spirochætæ for the greater part of the interval, other things being equal, his health should be better than that of the patient who is treated wih mercury only.

3. That, if subsequent events justify the hope that a salvarsan resistant strain of S. pallida is not produced by repeated injections, it should be possible to prevent patients who are still in the very early stages of syphilis from developing any symptoms of a later type. To accomplish this, however, it would be necessary to watch each patient carefully, especially with regard to his Wassermann reaction, and to repeat the treatment on the least indication of the latter returning to positive.

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## ON THE USE OF RADIUM IN OPHTHALMOLOGY.

RYERSON in the *Canadian Medical Association Journal* for December, 1911, says he believes that in radium we have a powerful, new aid to the therapeutics of the eye. In the cases of rodent ulcer and epithelioma of the lids, angioma, trachoma, spring catarrh, and in certain ulcers of the cornea, he can safely say that definite results have been obtained.

In conclusion, he asserts he can state, without exaggeration, that radium has proved its worth. As is the case with all new methods of treatment, too much has been expected of it, and the impossible has been attempted. True, carcinoma is still outside the possibilities of cure, while sarcoma, if superficially situated and of recent growth, will rapidly melt away.

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## THE ANATOMY OF SPINAL PUNCTURE.

The *Lancet* of December 2, 1911, points out that although the technique of spinal puncture for introducing analgesic drugs has been carefully studied the literature dealing with the anatomy of the parts involved affords few recent additions to our knowledge. The importance of an exact knowledge of the anatomy of the subarachnoid space and of the precise limits of the

conus medullaris can hardly be overrated. Early in the last century Key and Retzius made some careful studies with regard to the former, and Quincke, Gerstenberg, and Hein, as well as Propping, have extended our knowledge. Majendie's experimental work upon the movements of the cerebrospinal fluid is too well known to need comment, but when we find that much discrepancy of opinion persists both as to the site of election for puncture as well as to the causation of dangers immediate and postoperative, we are compelled to believe that the subject is still imperfectly understood. Dr. William C. Lusk (in the *Annals of Surgery* for October) has published a statement of the results at which he has arrived after a careful series of dissections of the whole region involved. He has located the exact position at which the spinal cord terminates, and describes minutely the arrangement of the arachnoid membrane, the position of nerves and veins, as well as the conus itself, as regards their possible injury by the puncturing needle. The dissections of the arachnoid membrane convinced him that any puncture undertaken between the conus and the cervical region must be attended with the greatest risk of penetrating the cord. In many dissections there were adhesions of the arachnoid membrane to the cord throughout more or less of its length, and Dr. Lusk concludes from this that "if cerebrospinal fluid can be constantly drawn as a result of mesial puncture at or above the level of the conus, in many instances the substance of the cord must be traversed by the needle and the fluid taken from the anterior portion of the subarachnoid space." Puncture in the dorsolumbar interspace in a certain proportion of cases results in damage to the cord, as some dissections revealed the fact that the arachnoid is not infrequently adherent to the posterior surface of the conus or cord.

Rehn has shown experimentally that injury when associated with injection of such drugs as stovaine or tropacocaine leads to immediate death with medullary symptoms. The cases of death quoted by Dr. Lusk are of peculiar interest in this connection, and deaths otherwise inexplicable become clear in their causation if considered in the light of his work. Puncture below the level of the conus involves an accurate acquaintance with the disposition of the nerve roots of the cauda equina. Although, as the dissections show, the distribution of the nerve roots in the arachnoid sac varies, yet their arrangement in relation to one another appears fairly uniform. It is pointed out that while most of the nerve roots fall away to the sides, the lowest sacral nerve roots occupy a mesial position, and so are rendered more liable to trauma. The not infrequent paralysis of the bladder and sphincters consecutive to lumbar puncture finds an explanation in this fact.

Dr. Lusk deals carefully with the question of the sacral leverage, so important when the position of the patient at the time of puncture is considered, since in forward tilting of the pelvis, which exists in extreme lumbar flexion, the mesially placed sacral nerves will become taut and present posteriorly. Hence the pelvis must be prevented from any forward tilt, as the needle impinging upon a taut nerve root will impale it, while it will push a slack tissue aside without injury to it. The characters and arrangement of the cauda equina in these dissections are grouped into five varieties, and it is shown that even an escape of the cerebrospinal fluid after puncture cannot in all cases be accepted as a proof that the point of the needle is not engaged in some nerve structure. The site of maximum safety for performing the lumbar puncture seems from the facts advanced to be the interval between the fourth and fifth and lumbar vertebræ made mesially, while the lumbosacral space, we are told, is probably equally safe, but only second in order of desirability. Dr. Lusk elaborates the rules for the technique of the puncture, basing his conclusions upon his anatomical findings. He believes that a blunt needle is safer than a sharp one, and in most cases entrance a little to the side of the middle

line avoids the tougher superficial structures and allows greater precision of touch than in the case of the central puncture.

There can be little doubt that the arguments adduced and the admirable reproductions of photographs of the dissections will enable the workers in this field of surgery to understand with greater clearness the etiology of many of the dangerous and painful sequelæ which have been recorded as following the lumbar puncture. With this increased accuracy of their pathology it is not too much to expect that the present somewhat serious list of deaths and post-operative troubles may become materially curtailed.

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## TREATMENT OF CHOLERA BY INJECTIONS OF HYPERTONIC SALINES AND PERMANGANATES INTERNALLY.

In describing the results obtained by this method among Europeans at Palermo, who suffered from cholera, ROGERS says, in the *British Medical Journal* of November 18, 1911, that he is confident of the advisability of early and frequent intravenous injections. His opinion is based on the following considerations: He has never seen any harm result from an intravenous injection of hypertonic solution in the acute stages of cholera, with the sole exception of excessive temperature reaction, which is preventable if the proper precautions are strictly carried out. On the other hand, he has often had to regret the decision not to give an intravenous injection in a cholera patient coming under observation with a fairly good pulse and a blood-pressure of over 80 mm., but who subsequently required one owing to the supervention of collapse, and was ultimately lost. This shows that he has not hitherto used the intravenous method as often as is advisable, and the rules he has laid down regarding them require to be reconsidered in the light of his further recent experience.

It has been shown that the patients in whom a reliance on subcutaneous injections proved disastrous all had blood-pressures between 80 mm. and 100 mm. on admission, so that it is clear that withholding intravenous injections when the blood-pressure is over 80 mm. is not an altogether satisfactory rule. Fortunately we have an additional guide in the specific gravity of the blood, and it is of great interest and importance to note that in all the patients admitted with a fairly good pulse, but who collapsed fatally later, the specific gravity of the blood was 1063 or over on their arrival, which means that they had already lost three or four pints of fluid from their blood. Now with such high specific gravities, continued copious diarrhea is almost certain to produce collapse within a few hours, while the blood is already concentrated to such a degree as to make the intravenous injection of three to four pints at a not very rapid rate a perfectly safe and highly beneficial procedure in cholera. Again, we have seen that once serious collapse has taken place, although death in this stage can in the great majority be averted by one or more intravenous injections, yet a considerable proportion of such grave cases will ultimately be lost from one or other of the later complications, such as severe reaction, uremic or lung complications, or asthenia. The further diminution of these still not infrequent causes of death can only be accomplished by anticipating and preventing the occurrence of serious collapse by replacing the great loss of fluid as early as possible; or, in other words, by intravenous injections as soon as the blood has become markedly concentrated, as shown by a specific gravity of 1063 or over, even though the strength of the pulse may only have fallen a little below normal, as indicated by a blood-pressure of not much below 100 mm.

The author has previously advised that intravenous injections should always be given if the specific gravity is extremely high, such as over 1065, but he would now go further and recommend this treatment to be adopted as soon as the specific gravity has risen to 1063 or over in the stage of acute copious diarrhea, in order to avert the nearly inevitable collapse if they are with-

held. If, however, the acute diarrhea stage is passed, and the reaction stage with a rise of temperature has commenced, the blood-pressure being over 80 mm., an intravenous injection is not necessary, while it is more likely to produce an excessive febrile reaction at this stage.

The author has little to add as to the prevention of uremia, except to repeat that the further reduction in the death-rate from this complication must mainly depend on the earlier use of intravenous injections to prevent the onset of collapse with the accompanying stasis of the renal circulation, which is the essential cause of the subsequent deficient renal secretion. It has long been known that the frequency of uremia is in proportion to the duration of the collapse stage. This point is further illustrated by the fact that all the fatal uremic cases at Palermo were admitted on the second and third days of the disease, while all also showed a specific gravity of 1063 or over. Several patients admitted after two or more days' complete suppression of urine, and with a high specific gravity and threatened uremia, were treated by slow intravenous injections (isotonic solutions being used if the blood-pressure was nearly normal and the diarrhea stage past), with the result that the urinary secretion was rapidly reëstablished and recovery from a very grave condition followed. If in this stage the specific gravity is not above normal, intravenous injections might produce edema of the lungs, so in that case only subcutaneous and rectal salines should be given. If the respirations continue to be frequent and labored after urine is being freely passed, edema of the lungs should be sought for, and if present all saline injections should be stopped.

Such are the lessons the writer learned at Palermo, and he ventures to hope that their application in the future will do something to still further lessen the death-rate of cholera. That cases will still be met with of too virulent a nature, or coming too late under observation to be saved from a fatal termination, it is useless to deny. Nevertheless, these should be quite exceptional in previously healthy subjects, who are neither old nor extremely young, and who come under treatment at a fairly early period of the disease. In such he thinks the recovery-rate should be fully 80 per cent. However that may be, the results already obtained furnish a remarkable example of the successful application of modern methods of research, in discovering a life-saving method of treatment of one of the worst scourges which humanity is heir to, and one which should go far toward robbing the disease of much of its terrors in countries adequately provided with skilled medical men.

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## THE TREATMENT OF BRONCHIAL ASTHMA.

LEMANN in the *American Journal of the Medical Sciences* for December, 1911, adopts the usual plan and discusses separately the treatment of the attacks and the treatment of the intervals. The drug that will give the surest relief in an attack is the drug which we should reach for last, namely, morphine. The distress of a paroxysm is so great, the relief by morphine so complete and so sweet, and the occasion for the use of the hypodermic arises so repeatedly, that it is almost certain that we shall create a habit. Morphine, therefore, should be a last resort. Much safer, but also much less sure, is the action of atropine. Where it is successful its effect is probably to be attributed to its antispasmodic influence on the terminal nerve endings, causing a relaxation of the contracted musculature of the bronchi. In a relatively few cases nitroglycerin, by hypodermic injection, affords relief. These are probably cases in which the blood-pressure is high. Other means of relaxing the bronchial spasm have sometimes proved useful in his hands. Some of the patients have obtained scant comfort from smoking cigarettes of stramonium leaves or inhaling the fumes of burning stramonium leaves, nitre, etc. Perhaps the most efficacious drug

next to morphine is adrenalin chloride. Where it succeeds its action is nothing short of marvelous. Hardly have the 10 to 15 drops of the 1-to-1000 solution been given under or into the skin when the patient will declare that he is already better. In fact, it has been the repeated experience of the author that the relief begins before the hypodermic needle can be withdrawn.

In view of the fact that nitroglycerin and the nitrites are supposed to relieve asthma by their vasodilator and blood-pressure-reducing effects, while adrenalin is generally accounted a vasocontractor and augmenter of blood-pressure, the author has been interested in observing the blood-pressure during asthmatic paroxysms, before and after the administration of adrenalin by hypodermic. In general it may be stated that these hypodermics of adrenalin have had practically no effect upon the blood-pressure. In some instances, in fact in most instances, the blood-pressure is lowered about 5 mm. and returns within a few minutes to its original level. This action is the same whether symptomatic relief is obtained or not. The blood-pressure of asthmatics in paroxysms as observed by him was not as a rule high; most frequently it was from 100 to 125 mm. of mercury, and in one patient as low as 90 mm. In one patient the initial blood-pressure was 165, which fell after the hypodermic injection to 148. There was no relief in this case.

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**SYPHILIS OF THE NERVOUS SYSTEM.**

MOTT in the *British Medical Journal* of November 18, 1911, asserts that it is a fact that the cases of syphilitic disease of the nervous system diminish in number and gravity with each succeeding year following infection, although it must be admitted there is no essential difference in the histological changes met with in early and late syphilis of the nervous system. It is, however, comparatively very rare for parasyphilitic affections to occur within four or five years of the primary infection, and the average time is at least ten years after the appearance of the primary sore. Seeing that the great bulk of persons are affected in youth or early manhood, so the curve of incidence of onset of syphilitic affections of the nervous system reaches its maximum somewhere between twenty-five and thirty, whereas the curve of the incidence of onset of general paralysis and tabes reaches its maximum between thirty-five and forty. Whereas, on the one hand, syphilis of the nervous system produces more or less sudden obtrusive symptoms indicative of gross lesions due to meningeal irritation and vascular occlusion of a random kaleidoscopic character, with remissions and exacerbations causing new and variable paralytic and irritative phenomena, on the other hand parasyphilitic affections are usually so insidious in origin that it may be difficult to fix the date of the onset. Again, as a rule there is a continuous progress of the disease in which remissions and exacerbations are not nearly so manifest.

Syphilis of the nervous system, especially in the early stage, yields to all forms of treatment which would cause the destruction of the specific organism, but on the other hand parasyphilitic affections are seldom arrested; and though sometimes benefited by antisyphilitic treatment, the degree of benefit is inconsiderable when compared with the effects obtained in syphilis of the nervous system. The author asserts he has seen no disappearance of symptoms once established in tabes or general paralysis which could be associated with the treatment. Neither could we expect that mercury or arsenic in any form could restore neurones which have undergone degeneration, although when it is the syphilitic virus which is producing symptoms due to arterial and meningeal inflammation, the administration of these remedies gives relief by destroying the specific cause, and thus arresting and clearing up the inflammatory process before neuronic destruction to any considerable degree has taken place. If the spirochæta be the cause of these neuronic degenerations in para-

syphilis, how does it come to pass that it has never been demonstrated in general paralysis or tabes? whereas it has been demonstrated by many authorities in syphilitic meningitis and arteritis. It might be said that there is an intracellular granule form, but this has to be proved. So far the existence of an intracellular granule form rests only on the slender basis of analogy of the spirochæta to the tick fever spirillum, which has been shown by Leishman to have an intracellular granule form.

If we admit this premise, then it must be assumed that the spirochæta pallida has passed into a resting stage, and after a lapse of years—on an average ten—it has become active and caused inflammatory changes in the membranes, vessels, and connective tissues, with secondary irritation and destruction of the neural elements. The primary meningoencephalitic theory was the old view of the parasyphilitic affections, but most authorities now consider that the diseases termed "parasyphilitic" are due to a primary neuronic decay with secondary changes in the membranes, vascular and neurological structures. This view was taken by Sir David Ferrier in his Lumleian Lectures on Tabes Dorsalis. The positive Wassermann reaction, given almost in all cases of general paralysis both by the blood and cerebrospinal fluid, would suggest that the disease was the result of active syphilis; but whereas a case of active syphilis giving the Wassermann reaction in the blood after treatment may no longer give it, this is not the case with general paralysis according to the experienec of the author. He therefore assumes that until further evidence of a more definite nature is forthcoming to show that these late manifestations of a previous syphilitic infection are to be regarded as quarternary syphilis of a nature similar to glossitis, it will be better to accept the term "parasyphilis" or "metasyphilis," and to explain the symptoms by a premature and progressive decay of neural systems, localized in some cases to afferent systems, as in tabes, or generalized in others, as in general paralysis.

The author has not time to take up the possibility of there being a specific spirochæta for these parasyphilitic diseases, nor the question whether parasyphilis is a result of racial immunity by wide-spread syphilization; nor another view, that of Neisser, that the late manifestation of syphilis in the form of tabes and general paralysis may be the result of a modification of the action of the specific organism by the wide-spread use of mercury. Nor does he discuss the question of anaphylaxis as an explanation, but comes to the more practical side of the question of the differential diagnosis of parasyphilis and syphilis of the nervous system.

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### THE PHYSIOLOGICAL ACTION OF EXTRACTS OF THE PINEAL BODY.

JORDAN and EYSTER in the *American Journal of Physiology* of December 1, 1911, state that their experiments indicate that the pineal gland of the sheep contains some substance (or substances) which, on intravenous injection in certain animals, cause a fall of blood-pressure associated with a vasodilatation in the intestines, produce a slight degree of improvement in the beat of the isolated cat's heart, and cause a transitory diuresis associated with glycosuria in about 80 per cent of the cases. They have found, in agreement with Dixon and Halliburton, that the effect on blood-pressure in the cat is small and unimportant. It should be noted that their extracts were in all cases more concentrated than those employed by these investigators. On the whole, their work would seem to indicate that while certain definite effects on the circulation and secretion of urine are produced in certain animals as the result of intravenous injections of extracts of the pineal body, the action is relatively slight when compared with that produced by extracts from other glands known to furnish internal secretions.

Their experiments deal obviously only with a possible rôle of the pineal body in producing certain relatively rapid effects on the circulation, respiration, and secretion

of urine. They leave entirely untouched the possibility of more gradual effects over longer periods of time, as well as the influence these bodies may exert on metabolism or other functions and their relation to other organs of internal secretion. From the experiments of Dixon and Halliburton, and those recorded in this paper, it seems clear that the first-mentioned influence, so far as it is exerted by any substance produced in the organ, must be relatively small and unimportant.

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## CHRONIC ALCOHOLISM.

PETTEY writing in the *Journal of the American Medical Association* of November 25, 1911, asserts that the indications to be met in some cases of alcoholism are simple, and the treatment can be easily carried out, while in others they are so complicated that the resources of the best-equipped institution as well as the skill of the most resourceful physician will be taxed to the uttermost; but with the aid afforded by a well-equipped institution a competent physician can effect as large a percentage of cures in cases of chronic alcoholism as can be effected in any other serious ailment. The most skilful physician cannot treat patients successfully at their homes. The disadvantage due to their home surroundings and to lack of complete control over the patient will defeat his best efforts. Even a general hospital does not assure the physician such control and protection as this class of patients require.

The author wishes to utter a warning against any institution or physician offering to send a home treatment for alcoholics or drug victims. Such an undertaking is worse than folly, and when a proposition of that kind does not spring from entire ignorance of the conditions to be met, it is prompted by criminal avarice. Especially fraudulent is the offer to send a remedy that can be administered in coffee, etc., without the patient's knowledge, and thus overcome the desire for liquor and break up the habit.

The time required for the successful treatment of a case of chronic alcoholism varies from two weeks to two months. Those who promise to effect a cure in much shorter time than that promise more than they can perform. A "three-day liquor cure" is being advertised extensively throughout the country, and a number of institutes have recently been opened for the employment of this method. The treatment consists of the administration of a dose of cathartic pills, and after that the hourly administration of an emetic in liquid form, the emetic consisting of either lobelia or ipecac or of the two combined. An hour and a half from the time of giving the first dose of the emetic, the patient is required to take a drink of whatever alcoholic liquor he has been using, and this is repeated every half-hour until four drinks have been taken. All of these are promptly given over to the slop-jar with interest. The liquid emetic is kept up every hour for the first day, but only the four drinks are offered to the patient. If he asks for more liquor, it is given, and this is followed by an extra large dose of the emetic, sufficient to insure immediate and prolonged vomiting. The second and third days' treatments are the same, only the emetic is given at less frequent intervals, and only two drinks are required to be given on the second day. If the patient asks for more on that or on the third day, it is given, and this is followed by a double dose of the emetic.

The extreme nausea and vomiting from this course, if the patient can be made to take it, is supposed to disgust him so completely with whisky that he will not take it again. By the time he has been kept in this condition for three days he is so disgusted with whisky, himself, and everything else that an effort to swallow anything will cause him to vomit. It is true that he does not want whisky, because he is not in condition to take and retain anything, but he is no more cured of the whisky habit than he would have been had he drank until his stomach rebelled and had vomited three days and nights from the effects of whisky. His system is still

in a badly disordered condition; he is extremely nervous and cannot sleep, is totally unfit for business, and if he recovers it is because of the restorative forces of the system and not because of any curative effect the treatment had on him. Such sleight-of-hand fake methods cannot be too strongly condemned. There is no curative value in them, and the public should be taught to avoid them.

In undertaking the treatment of alcoholic patients, the physician should take a comprehensive view of the patient and his surroundings and endeavor to estimate correctly every influence which has in any way contributed to his enslavement, and to direct the life of the patient thereafter so far as to remove every one of the hurtful influences, as far as is possible. The physical man must be completely renovated and every function of the body restored to normal activity. The mental bias favorable to the use of alcoholic liquors must be eradicated and in its stead a positive aversion to alcohol must be established. The patient is to be given a new chance in life by being put on his feet with a clear head, in full control of all his faculties, and free from the dominating influence of alcohol. The consummation of such a work is certainly worthy of the best efforts of any man.

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### POSTPARTUM HEMORRHAGE.

In concluding an article on this subject in the *Australian Medical Journal* of October 21, 1911, HOOPER expresses these views:

Just as surely as the improper use of forceps, or the careless administration of anesthesia, causes the uterus to delay its firm contractions and retractions, so just as surely, if not more so, does delay in using instruments at the right time cause the woman to become so exhausted that her uterus is unable to contract firmly.

The author is a strong advocate for the immediate application of forceps in cases in which experience tells him that without their aid the uterus would be unable to expel the child, and he would strongly insist on the more cautious use of the anesthesia during the second stage. Still more would he most earnestly urge constant attention to the uterus directly the child is born, and particularly to the right way to perform the Dublin method of expressing the placenta. Of course, if violent hemorrhage occurs immediately following parturition due to an obviously relaxed uterus, he would immediately proceed to make the uterus contract by external manipulation, by the injection of pituitary extract, or hot sterile water at 120 degrees, and if the cord were pulseless and the placenta were in the cavity of the uterus, he would carefully and slowly extract it with his clean and gloved right hand, while the left hand retained the mastery over the uterus. This is the only condition which would make him hurry the third stage of labor.

Weber evidently considers tamponade to be the very best treatment performed in a proper manner by the use of sterile gauze under every aseptic precaution, it being especially important to pack the whole cavity of the uterus; the vagina should also be packed. He finds the packing, to be successful, must be allowed to remain for six hours at the most, when the uterus will be found firmly contracted and hemorrhage does not recur, because:

First, the pack acts as a foreign body and the uterus tries to rid itself of the same.

Secondly, by a mechanical pressure upon the lumina of the bleeding vessels by the gauze.

Thirdly, the blood coming into contact with the gauze clots more readily, and thrombosis in the vessels occurs.

Ahfeld and Veit oppose packing. Veit says he has not seen a single case of postpartum hemorrhage which would induce him to pack on account of hemorrhage. Personally, the author dreaded the risk of sepsis wherever he has used the uterine tamponade, and seldom uses the tamponade because it distends the uterus rather than making it contract.

At the Basle Women's Hospital, out of ten thousand confinements, seven died from postpartum hemorrhage, of which six had been tamponaded.

Weber claims that the use of Momberg's treatment in many clinics is so favorable that it must be considered a dependable one in serious cases of uterine atony, and as such is to be recommended to the general practitioner.

Momberg's method consists in passing a stout rubber tube several times round the body between the pelvis and the lower costal margin, and tightening it until pulsation in the femoral arteries ceases. The patient is given ¼ grain of morphine.

The tube is about the thickness of a thumb, and 2½ to 3 yards in length. It is placed just above the iliac crests and is slowly drawn tight by two people. When femoral pulsation ceases the tube is fixed with a pair of forceps. It is more easily adjusted if it be oiled at first, and as a rule it is not necessary to wind it round the body more than twice. When pressure is made the coils of the intestines slip up toward the thorax, but if any of them be compressed they remain for a considerable length of time without sustaining injury. The ureters also escape damage. The tube is kept tight for ten to thirty minutes, and it is slowly relaxed, the lower limbs being well bandaged first—if hemorrhage recurs it is readily readjusted. Out of 30 cases reported, 28 have been successful. Of these, eight were due to atony of the uterus, 12 to retained placenta, and two to laceration of the cervix. This method gives the obstetrician time for disinfecting his hands and the parts before manipulation. Patients tolerate the treatment well, though collapse may follow the removal of the ligature, the blood rushing into the lower limbs and producing anemia of the brain or heart. This may be obviated by the Trendelenburg position or by tilting the bed. Where other methods fail, this one may be the means of saving life.

Baudeloque's method of digital pressure of the aorta at the level of the fourth lumbar vertebra is difficult and inconvenient, and is not always effective, since the ovarian arteries, which branch off just below the bifurcation of the aorta, carry blood through the uterus, and a flow through them is not checked by Baudeloque's method. The inferior vena cava is compressed at the same time, and that is undesirable.

Briefly, then, the indication for treatment in certain cases of postpartum hemorrhage, and they are the most serious, lies in using every known effort to make the uterus contract without making any immediate attempt to empty the uterus of any piece of placenta which may remain within it.

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## THE TREATMENT OF CHRONIC HYPERTENSION.

VISSCHER in the *Journal of the American Medical Association* of December 2, 1911, says he believes that there are influences productive of chronic hypertension which are to be mastered only by the intelligent conduct of our patients. It seems beyond doubt that mental overactivity stimulates both pituitary gland and adrenals, which throw pressor substances into the circulation. What lack of sleep will do, and the absence of relaxation to the brain (which is the characteristic of worry), what influence on hypertension must be attributed to the well-known though ill-admitted fact that libido sexualis, especially in man, is kept overstimulated in city life, can only be presumed. All considerations combined, it seems that hypertension has to be met and treated more during the hours the patient is away from work than when he is at it. It is well-nigh impossible to divert the mighty current of business life, as long as ambition is met by limitless opportunity, and the multifarious enjoyment of so-called excitement can be bought only by overstraining the earning power.

As to the hours of sleep, it should be better understood that carbonic acid is of high pressor power, that sleep in ill-ventilated rooms will interfere with metabolism during one-third of our lifetime, a time additionally spent in the digesting and assimilation of the heaviest meal of the day. Invariably, for reasons already given, people with hypertension would do better to eat light evening meals with ease thereafter for a few hours, then take a mod-

erate amount of physical exercise, a warm bath, perhaps a warm enema, and sleep in a warm bed with the windows wide open.

A few remarks on drugs follow: Do iodides act through reduction of viscosity of the blood (Romberg) or through thyroid stimulation? Or does the thyroid act through its iodine in organic compound? We know that they do reduce headache and precordial pain; they do not lower the blood-pressure in advanced hypertonic arteriosclerosis; they do everything in syphilitic arterial disease. They should be given with great caution, since Krehl's warning, in cases which show thyroid enlargement, as it has happened too often that a daily amount of 15 grains of the potassium salt during two weeks caused very rebellious thyroidism. As iodides have to be continued for long periods, an alternation, as Elsner advises, from the sodium through the strontium and rubidium to the potassium salts will be commendable. Sajodin has been well tried.

Of decided benefit is theobromine, a dimethylxanthin, a congener to caffeine, a trimethylxanthin. Xanthins are pressors, still through direct stimulation of the renal tubar epithelium (if this be not diseased) in large amounts they cause a fall in blood-pressure. Diuretin acts somewhat similarly. Ever since Huchard introduced theobromin, we have found it potent in angina and anginoid states up to 7½ grains, well distributed during the day.

Though nitrites relieve anginoid suffering, they do not always do so by a general lowering of blood-pressure. After using sodium nitrite, the author has repeatedly had good reports from his patients. These reports were accompanied by higher manometric readings. MacKenzie's observation is instructive. During an attack of angina with a pulse-pressure of 190, amyl nitrite gave instant and complete relief, the pulse-pressure rising to 200. This change evidently denotes the action on the coronary arteries. Still we must be aware of an angina with low tension due to dilatation or myocarditis or even aortitis. Their excessive dilatation of the cerebral vessels limits their use in hyperpietic nosebleeds. Erythrol tetranitrate the author asserts he has given zealously, but had to reduce the doses greatly to prevent the violent headaches so often caused by it. An advantage of the nitrites is in their combination with the tonic cardiacs, if needed. Aconite is of noted help in the excessive hypertension and pounding heart in toxemia of pregnancy. Moreover, double-drop doses during the day have given great relief without perceptible harm to the heart.

Chloral, veronal, and medinal are reliable agents to procure sleep when attacks of vertigo, dyspnea, and pounding heart make the night a time of horror, and chloral may be given in effective doses; perhaps too often our patients fail to receive relief, which is withheld from them by our fear of doing harm. From year to year a new hypnotic comes on the market, which surpasses all its predecessors in effectiveness and absence of depressing effects on the heart. But it is just this depressor effect of the chloral group, which aids in combating the dyspneic unrest, which robs the patient of his sleep. Small doses of chloral during the day are very helpful by their depressor effect.

In this respect the author adds that in the senile heart, both with and without hypertension, digitalis is an ideal drug and should not be withheld on account of its pressor power. A good deal of this hypertension, already compensatory, is due to venous stasis, with rest, massage and partial depletion; the use of digitalis for a few days, guarded by some iodide or nitrite, will tone the myocardium and bring decided improvement. The use of bromides for three or four days at a time will help. With thiosinamine, fibrolysin, and sulphocyanite of sodium the author asserts he has only a bowing acquaintance. And very recently, on Rumpf's recommendation, he has begun the application of high tension oscillating currents, which can be easily given as a house remedy.

As in the degenerative changes accompanying secondary arteriosclerosis the deposit of calcium salts adds to the rigidity

of the artery, it has been deemed well to reduce the lime intake, which means the exclusion of hard water, the theoretical limitation of eggs, cheese, rice, asparagus, carrots, and milk. On these grounds, strontium or sodium lactate is given. One of the latest drugs, sulphocyanite of sodium, derives its supposed effect from its calcium dissolving potency.

A practical question is, How does altitude influence hypertension? It is as yet hard to answer, though in rough outline there is an apparent parallelism between atmospheric pressure and blood-pressure.

The author states that in California they acquire the necessary information by sending their people on trial trips to any altitude desired; again it all depends on the heart's tonicity.

When the crest of this wave of hypertension which has struck our profession will have passed, leaving in its wake many a shattered notion, a flotsam and jetsam of sphygmomanometers, broken cuffs, and pressure records, the level of our useful knowledge will have come up to a more adequate management of this pathologic condition. May we learn and teach not to grow old before our time, for growing old before one's time is what hypertension means. To depress hypertension in the aged is to take the wind out of his sails, which carry his lifeboat into the haven of rest; to reduce the hypertension in the man of forty-five is to save him from shipwreck on the banks and cliffs of the very Golden Gate of mature life.

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### A CASE OF CAMPHOR POISONING.

The *Calcutta Medical Journal* for August, 1911, contains a report by Roy of camphor poisoning.

A Hindu married woman aged 28 had an attack of choleraic diarrhea in the month of July. She had copious stools and vomiting. The husband of the woman was a railway guard and little educated. He purchased a bottle of Rubin's spirits of camphor and left instructions in the house to give according to written directions. Some one in the house, thinking that real and sure cure lay not in small doses but in heroic doses, administered the whole bottle of camphor in three doses. The diarrhea was stopped, but the patient began to vomit, and there was a terrible burning pain in the stomach and the throat.

The author saw the patient three days after the accident. The patient still complained of pain in the throat and stomach, and vomiting was still present. She was anemic and pale; conjunctiva was bloodless. She did not take any food, as there was complete loss of appetite, and she complained of thirst.

She seemed to be in a helpless condition —quite restless, sometimes sitting, sometimes lying down, often in pitiable postures. She had a low muttering delirium, a vague look, and seemed inwardly suffering from some anguish which she could not express.

There was fever in the beginning, but when the author examined her he found her cool. Palpitation of the heart was present, and there were occasional symptoms of suffocation. The pulse was slow and feeble. The lungs were quite free. The bowels were constipated and the urine scanty.

As she had had no sleep for some days, she was given a bromide mixture with belladonna. She slept well, but delirium was not abated in the beginning. She was given whey and barley water to make elimination free. No solid food was given for four or five days until the burning sensation in the throat and stomach passed away. On the fourth day Roy had to give her some gastric sedative to allay the pain and irritation. She was less delirious now, but sometimes talked incoherently. Her mother was brought down from up-country, and this soothed her mental condition. She still complained of palpitation.

She was now given milk and soup daily. She gradually rallied, and the palpitations improved.

Camphor poisoning is very rare and generally not fatal. Taylor mentions the case of a woman who took twenty grains of camphor and in whom serious symp-

toms occurred, but recovery eventually took place. Blyth mentions the case of a woman, pregnant four months, who took about 184 grains of camphor with the object of procuring abortion; she suffered severely, aborted, and died in a comatose condition. Davies mentions a fatal case of camphor poisoning which occurred in a child aged two years and eight months, after eating a piece of solid camphor weighing about 30 grains. Chevers records two cases—one had camphor administered with sweetmeats; he died after two days. The other took a pice worth of camphor. Hehir mentions a case of camphor poisoning in a woman who took two ounces of spirits of camphor to relieve headache and other discomforts associated with suppressed menstruation. Blyth is of the opinion that from 7 to 40 drops of Rubini's camphor have produced coma, foaming at the mouth, convulsions, partial paralysis.

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## ADRENALIN CHLORIDE IN THE TREATMENT OF CARDIOVASCULAR COMPLICATIONS OF LOBAR PNEUMONIA.

BROWN in *American Medicine* for November, 1911, expresses the view that the cases which have a very sudden fall of pressure may best be compared to a steam engine running under a normal pressure of steam which is subjected to the sudden withdrawal of the load or resistance. The immediate result of this will be a racing and destruction of the engine, unless the load or resistance can be quickly reintroduced. A similar condition exists in the heart under these circumstances, and as the vessels fail to respond to the vasomotor control the heart will increase in rate and be accompanied by pulmonary edema, death intervening due to an exhausted heart. The problem of treatment is therefore to introduce some substance which will quickly cause a contraction of the peripheral vessels and act as a governor. It is necessary that this peripheral resistance should be sustained for some time to be of any great value. To determine whether adrenalin possessed this property, he conducted a series of experimental injections, selecting the intramuscular administration in preference to administration by mouth, because of the uncertainty of action when used in the latter way, and in preference to the intravenous method, because of its slow absorption from the muscle. For these experiments he selected patients between the ages of twenty and fifty, whose arteries should still retain the possibilities of contraction and dilatation. All of these patients were given 15 minims every twenty minutes for four doses, the pressure being taken every hour thereafter until it returned to the low point. They found the pressure would be maintained above the point recorded before the injection for about four hours, and the rise would be noticeable about fifteen minutes after the first injection, the maximum pressure being reached in about one and three-quarters to two hours from the time of the first injection.

A second series was given to some of these patients, resulting in a second rise sustained for about the same length of time, thereby demonstrating that the blood-pressure would be maintained for a considerable period and a perfect response to a second series if it became necessary to maintain the pressure for a longer period of time.

The author advises the intramuscular injection of adrenalin chloride only in cases of impending pulmonary edema if they present the clinical picture of low pressure. He believes that it should be used in 10-minim doses before any signs of edema appear, provided the pulse shows a marked tendency to increase in rate and the blood-pressure is below 110, and the other symptoms of vascular dilatation are present. If edema develops suddenly during a pneumonia it should be used in 15-minim doses every twenty minutes for a series of four to six doses, or until the symptoms are controlled, and this series should be repeated if there are any signs of a return of the edema; provided we have definitely differentiated this edema from the edema accompanying acute dilatation of the heart.

## A RAPID METHOD OF INOCULATION AGAINST TYPHOID FEVER.

NELSON and HALL, of the Medical Corps of the U. S. Army, have this to say about the equipment, personnel, and technique which they advise. In their regiment the equipment and personnel used for the rapid inoculation of a large body of men was as follows:

*Equipment.*—One alcohol stove with a shallow pan of about one-quart capacity. Two hypodermic syringes of a make which permits sterilization by boiling, with six sharp needles for each. One bottle each of tincture of iodine and collodion with camel's-hair brushes. Two boiled medicine glasses, some clean towels, and a small quantity of sterilized gauze.

*Personnel.*—Two medical officers; one sergeant, hospital corps, in charge of the individual record of the inoculation; one private, hospital corps, to apply iodine to the arms; one private, hospital corps, to apply collodion to the needle punctures; one private, hospital corps, in charge of the stove with constantly boiling water.

A box or something suitable for use as a table is covered with clean towels, and on these are placed a few pieces of sterilized gauze to receive the sterilized syringes and needles and the sterile medicine glasses containing the vaccine.

The inoculator immerses the needle in the vaccine in the medicine glass; after filling the syringe he stirs the vaccine by discharging the syringe into the glass; this is done several times, and should be repeated at frequent intervals throughout the inoculation because of the fact that the vaccine being a suspension and not a solution, precipitation of the bacilli will occur, and dosage (as far as numbers of the bacilli administered) would not be uniform.

So far as the inoculation is concerned, it is immaterial whether or not the subject has had a bath the same day or a week before.

On arrival at the infirmary the men are directed to roll their sleeves well up to their shoulders. An assistant with iodine then paints an area about 15 mm. in diameter at the insertion of the deltoid muscle. This completed, the man steps forward to the physician, who is ready with a syringe with sterile needle attached and filled with well-mixed vaccine. The needle is plunged into the skin through the iodine-painted area, the proper quantity of vaccine is discharged and the needle withdrawn, when the man passes to the assistant who applies collodion to the needle puncture, thus sealing the wound at once. The man is directed not to roll his sleeve down until the collodion has hardened, when the operation is complete.

After an injection has been given, the inoculator detaches the needle used, and it is transferred to the boiling water by the assistant in charge of the stove, who returns a clean needle from the boiling water to the inoculator. The needles are withdrawn from the water in the order of their entrance. This arrangement and the number of needles used permits one needle to be in use and five needles to be constantly boiling.

In their regiment and with this method, by which each man has a freshly boiled needle and a sterile hypodermic (which, by the way, is reboiled once every hour), they have been able to vaccinate men at the rate of 300 inoculations per hour. The efficiency of their cleanliness and the accuracy of their dosage has been demonstrated by their results, which are here enumerated:

1. In this series of 3500 injections of the vaccine they have not had a single case in which the temperature rose to 102° F.

2. No infection of any character has been observed, not even a suspicion of such an accident.

And last but not least, there has not been any evidence of any ill effect of any nature whatever which, in their opinion, can be traced to the vaccine.

These results they attribute, of course, to the accurate preparation of the vaccine and also to their method of administration, in which the iodine, careful sterilization of instruments, and most careful mixing of the vaccine in each syringe dose given were used.

Care must be observed to give the vaccine subcutaneously and not intravenously, as has happened in one case which was noted by them, but did not occur in their regiment. In this case of intravenous inoculation the puncture was not made at the insertion of the deltoid muscle but well down on the anterior aspect of the arm.

In this case the reaction was extreme, temperature high, diarrhea; malaise and herpes labialis were marked, and prostration existed for three days. At the site of puncture absolutely no local reaction was noted, not even redness—and the reaction commenced almost immediately after the inoculation, significant evidence that the vaccine entered intravenously.

In this series of inoculations not a single case reached a temperature of 102° F., and in not a case did the reaction exist longer than twenty-four hours; in the vast majority the reaction was over in twelve hours. The reactions are considered under the heads local and general.

As a rule the *local* reactions were more numerous after the first dose, less so after the second dose, and of least frequency of occurrence after the third dose.

To them a typical reaction consists of an acutely inflamed area surrounding the point of inoculation. The size of this area may vary from 1½ to 3 or 4 inches in diameter. It does not look like an abscess. It is hard and indurated and has considerable local temperature, the entire arm may ache more or less, and the axillary glands are somewhat tender.

The height of this reaction is reached within eight or ten hours, and by the end of twenty-four hours, although the area around the point of inoculation is still red, it has ceased to be painful and the patient ignores its existence. It is the opinion of the authors that a local reaction extending over a period of time greater than twenty-four hours is caused by some other agent than the vaccine.

In this series of inoculations a systemic reaction was noted in about 7 per cent, and was most frequent after the second dose, next after the first, and of least frequency after the third dose. It consisted of a temperature of about 100° F. and malaise; these were consistent, and, in exceptional cases, there were diarrhea, insomnia and nervous symptoms, herpes labialis, and, most rare of all, an acute general erythema with an occasional spot not unlike a "rose spot."

The other symptoms noted are irregular in character and vary in duration. Insomnia and nervous symptoms may last for forty-eight hours, but as a rule are over within twenty-four hours.

In their regiment provision was made for these reactions by excusing the men treated from all duty for twenty-four hours after inoculation and instructing them to avoid alcoholic drinks, muscular exertion, and exposure to the sun, for it is their belief that failure to observe these precautions after inoculation will, in a large percentage of cases, result in a sharp reaction, which can be prevented by strict observance of these instructions.

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## DRUGS IN RHEUMATIC CONDITIONS.

STOCKMAN in the London *Practitioner* for January, 1912, writes on this topic:

The practice is to give at frequent intervals as large doses of salicylates as can be conveniently tolerated, and this is justified by the fact that all salicylate compounds are rapidly excreted from the body by the kidneys, and further, that before excretion they are converted into an inert compound with glycocoll-salicyluric acid. Therefore, in order to have the drug circulating in the body fluids in an active condition the supply must be relatively large and frequently repeated. For the patient's comfort it is necessary to avoid the use of doses which are unnecessarily large, as they bring on the familiar symptoms of deafness and ringing in the ears, which may be taken in the majority of cases as a hint to reduce the amount.

Profuse perspirations and skin eruptions are other inconveniences which frequently follow the administration of salicylates. There is a very widely held idea that they

also act as heart depressants, but this is not borne out by exact observations on the blood-pressure in man or by experiments on animals. They bring on a certain feeling of misery and depression in many people, but this is attributable to an action on the nervous system rather than on the circulation.

With larger doses (250 to 400 grains per day), such as are sometimes given with the idea of thoroughly destroying the infective germ, vomiting frequently occurs, and it is possible not only to seriously depress the nervous system, but to bring on a dangerous condition of lessened alkalinity of the blood—"acidosis," as it is sometimes called. With the lessened alkalinity metabolism is upset, with the result that acetone appears in the urine and breath, while the patient becomes drowsy and lethargic or restless and delirious, and may suffer from disturbed respiration and "air-hunger." All this, except the vomiting, can be prevented, to some extent at least, by giving about twice the amount of sodium bicarbonate with each dose of sodium salicylate, and taking care at the same time to avoid the occurrence of constipation. As a rule, cases can be efficiently treated without the risks and anxiety consequent on such large doses. In an ordinary case of moderate severity 15 to 20 grains of sodium salicylate every three or four hours form a sufficient dose. With these amounts the pain in the joints and the temperature begins at once to be favorably affected, the former subsiding in from twelve to twenty-four hours, and the latter within forty-eight hours. The pulse and respiration fall with the temperature, and the joint effusion is absorbed in two or three days. The course of events resembles a crisis. Sometimes it is slower and resembles a lysis. If the temperature does not settle satisfactorily each dose may be increased, or one large additional dose of 40 to 60 grains may be given on one or on several days in succession. The administration should be kept up in the same or smaller quantity until the temperature has definitely settled to normal. If any relapse occur the salicylate should be at once increased. Additional absorption of salicylic acid may be brought about by applying a dressing of methyl salicylate on lint to the affected joints, and this has the further advantage of acting as a local anesthetic and soothing pain.

Both in adults and children the rheumatic infection may locate itself chiefly in the fibrous tissues and may leave the joints comparatively unaffected. In such cases the colonies of microbes lying deep in the valves of the heart, in the pericardium, periarticular tissues, and elsewhere, seem to be protected from the action of the salicylate, which, probably, only reaches them in small amount, and hence the response to treatment is not so rapid or satisfactory. Nevertheless, they generally in time yield to large doses along with free local application of methyl salicylate, but often not before one or more of the cardiac valves have been permanently damaged, or rheumatic thickenings have formed in other fibrous tissues. When these rheumatic indurations are quite recent the administration of potassium iodide and the application of small blisters exert a marked deobstruent effect. Massage is even more effectual if they are in situations which can be reached by it, and it is a good plan to massage every case in which they can be detected, beginning as soon as recovery from the acute infection is definitely assured. This prevents them becoming fibrous and chronic.

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### ETHER ANESTHESIA.

MAHONEY in the *Boston Medical and Surgical Journal* of October 19, 1911, has this to say concerning postanesthetic care:

From the time the administration of the anesthetic is discontinued until the patient has recovered consciousness, he should be closely observed, as it is during this stage that many disturbances of respiration may arise. Too much care and gentleness cannot be exercised in the transfer of the patient from the table to the truck or bed. By placing a folded sheet under the patient while on the table and using it as a ham-

mock, he may be transferred with the least amount of upset, thereby preventing or minimizing the postanesthetic nausea and vomiting.

It is an excellent practice, when circumstances permit, to turn the patient well upon his right side when he is put back to bed, as suggested by Hewitt, and to place a pillow at his back. In this position, stertor generally ceases; the tongue gravitates to the side of the mouth; a free airway is established; mucus and saliva are not swallowed; and should vomiting occur, any vomited matter will readily find an escape without interfering with breathing. The patient's chin should not be too near the sternum as it may interfere with breathing and retard the recovery.

It is the opinion of many observers that one of the common causes of postanesthetic nausea and vomiting is an irritation of the gastric mucous membrane by ether-laden mucus which has been swallowed. This condition may persist and become distressing despite our efforts before and during anesthesia to prevent it as far as possible. Gastric lavage is frequently tried. Some patients will wash their own stomachs without subjecting them to the use of the tube. Hewitt advocates giving the patients a tumblerful of hot water to which has been added a small teaspoonful of bicarbonate of soda. Buxton speaks highly of the addition of bicarbonate of soda to black coffee. The atropine given before anesthesia certainly helps to overcome or diminish this stomach upset. Neurotic patients are frequently relieved by the use of an enema consisting of sodium and potassium bromide, of each 15 grains, in 4 ounces of warm water.

Occasionally we meet with a case in which we have made every effort from start to finish to prevent the postanesthetic discomfort. Some of these cases obstinately resist all treatment, but with this type of case we must not lose sight of the fact that the persistence may be due to acetonemia. This condition may be recognized by nausea and vomiting, the patient being in a drowsy condition, sweetish odor to breath, and the presence of acetone in the urine. Copious enemata of a saturated solution of sodium bicarbonate administered slowly, and teaspoonful doses of aromatic spirits of ammonia given frequently by the mouth, may relieve the condition.

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## THE ASEPTIC TREATMENT OF BURNS AND SCALDS.

PORTER in the *Journal of the Royal Army Medical Corps* for November, 1911, reminds us that the treatment of these injuries by the ordinary method of oily applications is most unsatisfactory. The use of picric acid may be less so, but the author has had no experience with it. He does know, however, that extensive scalds or superficial burns, owing to their always being infected when they come under treatment, usually suppurate. This leads to further destruction of tissue, and scarring is very apt to ensue. At any rate, these injuries when treated in the usual manner with oily applications remain a very long time in hospital and convalescence is slow. Having lately seen an instance of a large scald (by boiling water) in which healing took no less than seventeen weeks, in spite of grafting, the author determined to treat the next case he saw by strictly aseptic methods from the very commencement.

On May 1, Gunner D. was admitted to the Alexandra Hospital at Cosham, having slipped into a copper of hot water. The right leg was scalded as high as the popliteal space, but the fore part of the foot and anterior surface of the leg escaped. He had been dressed with carron oil and lint before arrival. The author injected ¼ grain of morphine and had him anesthetized at once.

After removing the dressing, the whole of the limb was thoroughly washed with plenty of methylated spirit poured from a bottle and scrubbed by sterile swabs. The scalded surface was freely rubbed by the swabs, and all the denuded epithelium removed. At least ten minutes were occupied in this manner. The limb was then washed with iodine water, one drachm of

tincture to the pint. After this, plain white sterile gauze was placed in contact with the raw surface, and absorbent wool and a bandage over all.

Next morning the temperature was normal and the patient quite free from pain. There had been such considerable exudation that the dressing was saturated. The author thought it advisable to remove the wool and apply fresh, but the gauze was not touched. This was done again next day, and the leg was then kept outside the bedclothes to promote evaporation, and to try and get the wound to scab. The leg was slung next day from a cradle, and this materially assisted matters.

On the morning of the tenth day the cotton-wool was removed, and the gauze was found perfectly dry over the whole area, with the exception of a place over the inner ankle and center of the calf; the gauze at these places was soaked with pus, but no organisms were present. Over the rest of the leg the abraded surface had healed beneath the gauze. After soaking it off, the limb was slung from a cradle exposed to the air for four hours and a sterile gauze dressing reapplied.

The gauze again became soaked with pus over the unhealed areas, and so all dressings were again removed and the abraded surfaces dusted with boric powder and the limb kept slung. Final healing took place about the thirteenth day.

The ultimate result of this method of treatment was, he thinks, considerably better than one would have got if the injury had been dealt with by oily or greasy applications, but it is quite possible that one might improve on it. The great obstacle to immediate scabbing is, of course, the tremendous exudation of serum which follows the injury, and this is much accentuated by the scrubbing which one makes use of in order to sterilize the affected area. It was suggested to the author that it would be a good plan to have slung the limb from a cradle covered with gauze for a couple of days, but in addition to the risk of infection, the exposure of a large raw surface to the air would cause intolerable pain.

Adye-Curran's suggestion, viz., to employ continuous immersions until the bulk of the exudation had ceased, and then to apply a sterile dressing, might be worth considering, but there would again be the risk of infection. Another plan would be to smear the part with sterilized vaselin before applying the gauze.

Extensive injuries of this kind do not occur very frequently, and the author is therefore recording his results in this case in the hope that others may be induced to try some other line of treatment than the old-fashioned carron oil application.

He thinks if he had applied ointment to the small raw surfaces which were evident when the gauze was removed on the tenth day, instead of trying to get scabbing under boric acid, much more rapid healing would have resulted.

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## TREATMENT OF ACUTE ENDOCARDITIS AND MYOCARDITIS.

MEARA in the *Journal of the American Medical Association* of February 3, 1912, writes on this subject. He says there are three objects to be aimed at in the use of drugs in acute cardiac disease: (1) To control or modify the progress of the disease of which the endocarditis is a part or complication. (2) To affect the progress of the cardiac condition itself. (3) To meet the needs of the heart as they arise—*i.e.*, symptomatic treatment.

1. In the acute endocarditis of rheumatic fever, the salicylates should be continued in full dosage, 15 and 20 grains every two hours during the waking period—that is, there is no modification of the use of the drug when the endocarditis intervenes. It is impossible for one who has the opportunity to see many cases of rheumatism not to be impressed with the striking effects of the salicylates in rheumatism; and though it is agreed that the progress of the cardiac disease is not modified like the events in the joints, still it does seem irrational to neglect the only measure that can demonstrate its efficiency in other phases of the disease, if the drug does not depress the

heart, which Meara thinks is a very rare occurrence even in such doses as he advocates.

He acknowledges, however, that there is a wide divergence of opinion in this matter. While some men would push the salicylate to much larger doses, others contend that it is not safe or efficacious.

The one other mode of treatment directed against rheumatism, which has much vogue, is the alkaline, and it is contended by its advocates that it has a decided effect on the cardiac inflammation.

He does believe that the use of the alkali makes the salicylates better borne, and he is accustomed to combine the treatments.

A rough rule is to give double the dose of salicylate in alkali—*e.g.*, if giving 15 grains of the salicylate, to give 30 grains of the alkali, until the urine reacts alkaline, and then diminish the dose, but keep the urine alkaline.

In parenchymatous myocarditis occurring in diphtheria, the onset is usually late, but if it does occur while the process is active in the throat, the antitoxin should be pushed vigorously, for though the toxin combined with the heart muscle cannot be ousted, the combination of more can be prevented.

In typhoid its appearance does not contraindicate the use of the cold bath, as long as the reaction remains good, and in pneumonia the cold air is of double value when myocarditis ensues.

2. He does not think we have any drug that can affect the progress of the cardiac condition itself. One cannot be entirely indifferent, however, to the constant reference of the books to the use of potassium iodide in such conditions. He finds, however, that the references are almost invariably in very general terms, with no definite instructions as to how it is to be used or what the rationale of its usage is.

Potassium iodide belongs to the class of drugs known as alteratives, and that term covers about all we know of their action—that is, that they produce changes. There are no more real therapeutic agents than this class of drugs, as witness mercury and potassium iodide in syphilis. The fact that new tissue of syphilitic origin fairly melts away under the action of potassium iodide has led to its use in all kinds of conditions in which replacement of tissue new or old is formed, but with dubious results. That this drug may not yet prove an active agent in controlling inflammatory and degenerative changes in other conditions than syphilis, one cannot predict.

3. Before considering drugs, what local measures of relief may be afforded?

Local measures have been used (1) to modify the progress of the inflammation, and (2) to relieve such symptoms as palpitation, precordial distress, and pain. These measures consist in the application of cold, heat, or counter-irritants. The application preferred is the ice-bag over the precordium. This is indicated in cases of pain or distress and certainly gives relief to the patient.

Palpitation is also relieved, and it is maintained that the slower pulse, better heart-beat, and improved regularity claimed for this method can be demonstrated experimentally in the healthy subject. The ice-bag may be put on at intervals of several hours for an hour at a time or can be kept on continuously.

Care must be taken that the bag does not become a source of annoyance from its displacement and the effort demanded to keep it in place, as the fatigue ensuing would more than neutralize any benefit that might accrue from it. There is constant danger that these things may degenerate into senseless routine, and it is one of the commonest experiences to find that neither nurse nor patient makes any effort to keep the bag where it belongs.

Meara believes that the effects produced come through the reflexes, starting in the skin and impinging on the viscus innervated from the same segment in the cord as the skin area concerned, so that an ice-bag resting on the abdomen can scarcely have the effect on the heart to be anticipated from one resting on the precordium.

To some patients who stand cold badly, the application of heat over the heart in the shape of fomentations or poultices may

allay pain and distress. It is not a usual procedure.

It has been the practice from time to time to use counter-irritants over the heart in acute endocarditis, not merely to allay pain, but with the idea that it influenced the inflammatory processes. Blisters were commonly used. The practice is but rarely recommended in this country.

When pain cannot be relieved by local measures, or when precordial distress, anxiety, or palpitation is severe, morphine is indicated in doses of ⅛ to ¼ grain hypodermically.

In the first attacks of rheumatic endocarditis the above measures will suffice in the vast majority of cases to carry the patient through. The heart muscle is strong; mechanical defects have not yet had time to strain it, and our chief concern will be so to manage the convalescence as to study the cardiac reserve and spare the heart excessive demands that hasten it to a permanently crippled condition.

Sometimes, however, in the first attack, and much more frequently in recurring attacks, cardiac insufficiency intervenes, with rapid dilatation, dyspnea. cardiac distress, and occasionally, but rarely in first attacks, a dropsy.

When this condition comes on rapidly, it is accompanied by much mental as well as physical distress, and there is nothing that accomplishes so much at once as morphine. It should be given in doses of ⅛ to ¼ grain hypodermically. It quiets the mind, lessens the dyspnea, produces muscular relaxation, and accomplishes the maximum of rest. Sleep ensues, itself of the greatest value.

In such a condition the heart needs stimulation.

There is no drug comparable to digitalis unless it is strophanthus. Meara prefers, if the stomach has been in good shape and the condition does not threaten too urgently, the infusion of digitalis in doses of 2 to 4 drachms three or four times a day, until results are obtained.

When nine to twelve doses have been given it is wise to intermit, for such quantities will be operative if any quantity will, and more may prove toxic. The omission of the drug for two to four days allows of excretion of some of the accumulation. Other official preparations may be used if fresh and reliable. For more urgent use strophanthus stands preëminent.

There is no drug that operates more rapidly than a reliable strophanthin gr. 1/120 put into the vein or into the muscle. Its effect on the pulse in increasing its amplitude may be made out in a few minutes and on the urine in two or three hours. The dose may be repeated once in the next twelve hours if needed, but further dosage is hazardous. It is better to rely on the effects of the digitalis, which should be begun at the same time as the strophanthin effect in twenty-four to forty-eight hours.

Little reliance is to be placed on the glucosides of digitalis for prompt action or for full equivalent of the action of the leaf or its official preparations.

As the heart strength is restored the drugs should be withdrawn as rapidly as possible.

In the cases of acute myocardial degeneration we may have progressive weakening, slapping sounds, thready and rapid pulse, and some evidence of dilatation, especially to the right. This weakening, if not responding to rest and the measures advised, will need the administration of digitalis.

Besides this condition, we have sudden cardiac collapse, asystole. This occurs especially often in diphtheria. So rapid may this be that death ensues before measures of relief can be obtained.

Myocardial degeneration may be marked in diphtheria, but we have reason to believe that the collapse is more often due to vasomotor paralysis than to cardiac. Such vasomotor collapse is probably the cause of most of the deaths in the myocardial cases, and it is safer to treat such cases of collapse on that theory.

In vasomotor collapse or in surgical shock, the splanchnic vessels are dilated and the patient is literally bleeding to death into his own visceral vessels. The vaso-

motor center might or might not respond to stimulants, but the vessels will. A rapid and marked effect, though a temporary one, is obtained by a hypodermic of adrenalin, 15 to 20 minims of 1 to 1000 in normal salt solution, the strength in which it is usually dispensed. This should be given deep into a muscle, whose wide network of vessels, Meltzer has shown, absorbs as rapidly as a vein.

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### MANAGEMENT OF THE CIRCULATORY BALANCE IN CHRONIC INTERSTITIAL NEPHRITIS.

WELLS, in the *American Journal of the Medical Sciences* for January, 1912, says in discussing this condition that in the stage to which he refers the patient has passed through a prolonged period of great distress. There has been such respiratory distress as to prevent the patient assuming the recumbent posture, sleeping fitfully in his chair in a more or less erect and uncomfortable position. There have been a variety of uremic manifestations, such as headache, wakefulness, muscular twitchings, visual scintillations, drowsiness, mental dulness and aberrations, etc. Retinal and other hemorrhages may have occurred. Occult edema has appeared and gradually increased, with augmented distress, to the greatest tension, when, fitfully, the restraining barriers of intercellular tissue-serum attraction and areolar tissue resiliency give way, and with notable relief from the distressing symptoms, dependent dropsy is an established fact. The patient is now in a present and visible danger; the management assumes an importance, not greater, but more acute. What shall it be?

Removal of the superfluous tissue-serum is an essential first step. This is best accomplished by the use of elaterin. The method of procedure is important. During three days the diet should consist of thin gruels, cream and water soups, tea, coffee, water, and carbonated waters. The first and second days the total quantity should be about 1500 Cc. per day, during the third day the quantity should not exceed 1000 Cc., and the gruels and soups should be taken very sparingly or omitted. Every night, including the night preceding the first day, there should be taken 10 grains of mercurial mass, in two freshly made pills of 5 grains each. The first following morning there should be taken an ounce of castor oil; on each of the other mornings there should be taken an efficient saline cathartic. Beginning with the fourth morning, give 1/20 grain pure elaterin every hour for three doses; later 1/10 grain every two hours, until ten or twelve very free watery movements have been secured. This may require two or three days, during which time the patient should have no solid foods, and very little liquids. Later the standard diet, modified as may be required, should be gradually resumed. The total number of liquid stools will probably be from 15 to 20, and the quantity of tissue-serum drained away from 5 to 20 pounds. The filtered serum thus evacuated should be analyzed, and the results recorded. It is usually acid, straw- or amber-colored, having a specific gravity of from 1005 to 1030, and heavily laden with chlorides. The odor is sometimes peculiarly offensive. Following the intestinal drain the flow of urine usually becomes very free; the day's secretion has reached the enormous quantity of 6000 Cc., when previously it had been scanty. The siphonage thus started ordinarily continues as a free flow until the edema has completely disappeared; nevertheless, this action should be assiduously encouraged and stimulated, for example, by the use of infusion of active digitalis leaves, theocine, external warmth, the recumbent position, etc. During the entire course the intake of liquids should be well below the output. The advantage of this method of removing dropsical liquids lies, primarily, in the fact that they are selectively excreted by the intestinal and renal cells, ordinarily the albuminous and other useful nutritive materials largely remaining behind.

In some cases, from various causes, the method thus shortly outlined is impracticable. It will then be necessary to remove the serum directly from the subcutaneous tissues, preferably by means of

Southey's tubes. The pointed stylet makes an opening through the skin mainly by spreading the tissues; the small tubes are tightly grasped by the elastic tissues, thus preventing leakage; closure promptly follows removal of the tubes, and with the employment of full antiseptic precautions infection is almost unknown. Two tubes in each leg, one inside and the other outside, inserted just above the ankle, or at any other available points, are usually sufficient. Rubber tubes of the smallest caliber, as soft as rubber catheters, should be attached to the ferruled ends of the silver tubes and tied with ligatures, the ends of which may be used in retaining the tubes in place. In this manner the surface is kept dry, the draining tissue-serum being conveyed to suitable receptacles, thereby adding to the comfort of the patient and reducing to a minimum the liability of infection. The patient should assume a semirecumbent posture, preferably sitting in a chair, or lying in a specially prepared bed which insures an inclined plane for the body, with the feet in the most dependent portion. He should be made as comfortable as possible, inasmuch as much fortitude is required. The drainage should be continued until the edema has largely disappeared, and the flow reduced to an insignificant amount. Usually there may be removed in this manner from 10 to 30 pints in twenty-four hours, and from four to seven days of gradually decreasing flow will be required to complete the process. The advantages of this method lie in the directness of the attack and the certainty of results; the very obvious objection to it is that the tissue-serum is drained off as a whole, including its albumin and other nutritive materials. Upon removal of the tubes a dry antiseptic powder should be used and an elastic bandage applied to the feet and legs. The feet should be kept at a higher level than the hips. The small openings rapidly close under this management.

Removal of these large dropsical accumulations discloses an astounding degree of emaciation, although this may be anticipated with great exactitude from the moment when occult edema is detected. With complete exhaustion of the stored-up fats, and the patient's proteid tissues already heavily drawn upon, we are brought face to face with a very formidable situation, inasmuch as the continuation of this condition will lead to starvation acidosis, with all its distressing features. To meet this condition there will be required a most careful adjustment of the dietary, in the formulating of which close attention should be given to its every detail. The following may be considered as typical only, inasmuch as the individuality of the patient and his requirements must dictate the dietary:

| | Grams. | Calories. |
|---|---|---|
| Breads of all kinds, a minimum of..... | 124.0 | 496 |
| Oatmeal, or other cereal, a minimum of.. | 31.0 | 124 |
| Rice, variously prepared, a minimum of.. | 31.0 | 124 |
| Potato, variously prepared, a minimum of | 62.0 | 248 |
| Meat, fowl, or fish, lean, a minimum of.. | 31.0 | 124 |
| Meat, fat, a minimum of..... | 31.0 | 279 |
| Eggs, a minimum of ..... | 96.0 | 384 |
| Sugar, a minimum of ..... | 15.5 | 139 |
| Butter, a minimum of ..... | 15.5 | 155 |
| Cream, 15 per cent., a minimum of..... | 124.0 | 186 |
| Milk, 3 per cent. cream, a minimum of... | 500.00 | 150 |
| Cheese, a minimum of ..... | 15.5 | 162 |
| Total ..... | | 2571 |

To these there may be added, or to an equitable extent substituted for a portion, all kinds of succulent vegetables and fruits, properly prepared. The table salt should be limited to somewhat less than the secretory capacity of the patient's kidneys. The same rule should apply to the liquids taken, ordinarily from 1000 to 1500 Cc. is the proper quantity, but they should not exceed the output by the kidneys and intestines.

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## PARALYSIS OF THE RADIAL NERVE COMPLICATING FRACTURES OF THE HUMERUS.

Bac (*Thèse de Lyon, Journal de Médecine et de Chirurgie,* Oct. 10, 1911) notes that the diagnosis of radial palsy is immediately suggested by flexed position of the fingers and of the wrists and pronounced adduction of the thumb, the impossibility of extension and of supination, and anesthesia in the area of distribution. He calls attention to the fact that the surgeon should assure himself that the radial palsy is concomitant with the frac-

ture, since it has often happened that a disability long preceding injury has been attributed by the physician to the latter. He notes that in many instances these palsies are transitory, due then to a contusion or stretching of the nerve. In others they are partial, and in some they are complete and attended by the reactions of degeneration. The important point in his communication is from the prognostic standpoint. He quotes numerous cases showing that there is spontaneous cure after one or two years. He holds that the prognosis is relatively benign, that although spontaneous cure does not always result, it does so in the majority of cases.

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## ARTERIOVENOUS ANASTOMOSIS IN THE TREATMENT OF GANGRENE OF THE EXTREMITIES.

HALSTEAD and VAUGHAN (*Surgery, Gynecology and Obstetrics,* January, 1912) report that there is experimental evidence to show that in animals the circulation through the large veins of the extremities may be reversed, and that it is possible for the normal blood-pressure in the arteries to overcome the resistance of the valves of the veins.

Experimental and clinical evidence demonstrate that the anastomotic opening is not permanent, but that gradual obliteration by intimal overgrowth takes place in event of the failure of early occlusion by a thrombus.

There is not sufficient clinical evidence in the reported cases to show that the pressure of the blood in the arteries in the cases operated upon was sufficient to force the valves in the veins.

It has been shown, however, by the cases reported that early occlusion of the vessels about the anastomotic opening is the rule, and in many the opening never at any time functionated.

In the event of the arterial blood forcing the valves in close proximity to the anastomotic opening, it returns chiefly through the larger communicating veins in many if not most instances and does not traverse the capillaries.

A study of traumatic arteriovenous aneurism shows that with a normal arterial pressure it required weeks or months for the valves in the communicating vein to be overcome, as is evidenced by the gradual development of varicosities and the long-delayed pulsation in the veins remote from the seat of aneurism. Under these conditions the arterial blood supply is maintained partly through the usual collateral channels which are unobstructed. In cases of gangrene from obliterating diseases of the arteries, the collateral vessels are already occluded. In such a case immediate reversion of the circulation is imperative. This cannot be accomplished at present:

(*a*) Because of the obstruction offered by the valves.

(*b*) Because in many cases the circulating blood must also overcome the resistance offered by a thrombosed vein.

(*c*) Because the blood returns through the nearest communicating vein and does not reach the peripheral capillaries.

The final conclusion is that there is but one indication for the application of arteriovenous anastomosis in surgery—*i.e.,* in traumatic destruction of a principal artery, where end-to-end union of the torn vessel is impossible. In such case arteriovenous anastomosis might be attempted, and through it we might maintain a sufficient blood supply to preserve the integrity of the limb until an adequate collateral circulation was established.

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## EARLY DIAGNOSIS OF ECTOPIC PREGNANCY.

HUGGINS (*American Journal of Obstetrics,* November, 1911) in a paper on this subject states that one of the most important factors in its early recognition is the careful study of the patient's history, not for a month but for a number of years previous to the development of symptoms suspicious in character. By careful inquiry a history suggesting some previous tubal infection will be found in the great majority of cases. The patient may have been pregnant soon after marriage six or eight

years before, but not since. She may and probably will give a clear history of pelvic disturbances at some time during the past—in some instances severe, in others of such mild character that they may be overlooked. A period of sterility is strong evidence in favor of previous disease of the Fallopian tubes. It is true that all patients do not give a definite history of tubal disease, but that many do was recognized and commented upon by the earliest investigators. A careful study of the menstrual history is equally important. The exact date of its appearance, its duration, and character of flow should be carefully investigated. If the habit has been perfectly regular, any delay or irregularity in the presence of other unusual symptoms is sufficient to bring to mind the possibility of ectopic gestation.

When a woman whose menstrual period has been regular misses or goes beyond her time for menstruation, she will suspect pregnancy. If a flow from the vagina begins in a period varying from four or five days to three weeks after the regular time, continuing more or less regularly, accompanied by pains periodic in character located in the hypogastrium or on either side, extrauterine pregnancy should at once be suspected by the physician, unless some other well-defined condition is present to account for it. The vaginal hemorrhage may be dark-colored blood, coagulated at times; at others a blood-tinged leucorrhea, or in some instances bright-red. It is sometimes described by the patient as being different from the normal menstrual flow, and is therefore atypical. This hemorrhage is doubtless due to a partial separation of the ovum from its cyst wall, or to the separation of the decidua from the uterus.

The pains are due to the attempt of the tube to expel the ovum or escaped blood, which act as foreign bodies. There may be a number of severe attacks of pain lasting over a period of several weeks before the final rupture occurs. It is not infrequent that considerable blood escapes into the abdomen during these attacks, but not sufficient to produce serious symptoms. There are undoubtedly many instances in which the ovum escapes into the abdominal cavity with but moderate hemorrhage, becomes destroyed, and the woman recovers.

In 95 per cent of the cases of ectopic pregnancy seen by the writer, the history and local symptoms have overshadowed all others, and seldom in the early weeks have the usual general signs of pregnancy been present. It is true that this does not occur in every instance. In some cases there is no history of either pain or hemorrhage or flow of any kind, the first symptom being that of sudden severe pain and collapse. Careful study of the histories in fifty-two cases which had gone on to rupture in the writer's experience, showed that in all but five there had been some irregularity of the normal flow and pain before the final rupture and collapse.

The local signs elicited by pelvic examination are not always as satisfactory as might be desired. The softening of the cervix is not so marked as in normal pregnancy; the uterus is enlarged, but not to the same degree. Unless the abdominal wall is very thick, the enlarged tube, which is extremely tender on pressure, can be readily palpated. Traction upon the cervix usually produces great pain, and that sign, if present, taken into consideration with the other symptoms above referred to, makes diagnosis doubly certain.

Few conditions of the pelvic organs produce symptoms similar to the above.

Abortion seems to be frequently suspected in the presence of the above symptoms. A careful history, and the absence of tenderness on either side of the uterus, will usually eliminate the possibility of this condition. We do not find severe pains in abortion during the first six weeks of pregnancy unless there is some complication present. Abortion, in the presence of inflammatory disease of the adnexa, with adhesions, can no doubt be misleading. Few cases of ectopic gestation occur in the presence of acute infection of the tubes.

Salpingitis or pelvic peritonitis is seldom attended by such symptoms as those de-

scribed, but in some instances it may be difficult to differentiate between the two. Careful study of the history will serve as an aid. The menstrual flow is not delayed in the presence of inflammatory lesions, but is usually earlier than in customary health. The study of the temperature chart and a careful blood count are also aids of considerable importance. An enlarged tube from ectopic pregnancy, and a tube swollen from infection with its surrounding exudate, palpated in the same position give such different sensations that it is difficult to see how this mistake can often occur.

In those cases of intrauterine pregnancy which are accompanied by hemorrhages, the absence of severe pain or colic, also the absence of pain at either side of the uterus, are important factors in the differential diagnosis. Oftentimes the pathologist can be of great assistance if he is about to determine the presence or absence of decidual cells by examination of the uterine scrapings.

Finally, in the presence of strong presumptive symptoms we can eliminate doubt by opening the cul-de-sac, and thus immediately establish a diagnosis with but little risk to the patient.

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### THE PREVENTION OF THE RECURRENCE OF GALL-STONES AFTER OPERATION.

KEHR (*Münchener medicinische Wochenschrift*, Jahrgang 58, Nr. 49) reports recurrence of gall-stones in a patient sixty-four years of age operated upon four years previously for common-duct stone. At the time of operation the patient was already suffering from biliary cirrhosis, but in spite of this he recovered after the removal of a single stone from the retroduodenal portion of the common duct. For three and a half years after the operation the patient's health was good; then he began to suffer with loss of appetite and slight jaundice, but no pain. Later the jaundice became very marked, and operation was advised. The liver was found to be cirrhotic, the common duct greatly dilated and containing purulent bile, and a stone the size of a hazelnut was wedged into the retroduodenal portion of the duct. This stone was removed and sent to Professor Aschoff in Freiburg for examination. He reported that the stone was 23 mm. long by 14 mm. wide, dry, dark-brown, and showed numerous fissures which extended into the center of the stone. On account of the macroscopic appearance, the absence of definite strata, and the peculiar consistence, it could be determined that in all probability the stone was formed in the common duct itself. The most interesting feature was that its nucleus was a piece of silk suture material which had been used in the previous operation.

The author believed that this was a true case of recurrence after drainage of the liver, for he had not removed the gall-bladder, which was small, empty, and shriveled, at the first operation in order to make the operative procedure as uncomplicated as possible. He considers that a new stone had formed in the gall-bladder, had then passed into the common duct and there increased in size; but this supposition was incorrect, as shown by the investigation, because the stone was found to have been formed in the common duct itself around the knot of a silk ligature. This observation shows that before one speaks of a true recurrence the stone should be carefully studied, especially with reference to its nucleus. Since this experience the author no longer uses silk for suturing an incision of the common duct, but employs the finest catgut instead.

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### OPERATIVE MOBILIZATION OF THE KNEE-JOINT BY THE INTERPOSITION OF AMNION.

SCHMERZ (*Beiträge zur Klinische Chirurgie*, Bd. 76, H. 2) states that of the pathological changes in the knee-joint which most frequently lead to ankylosis are internal injuries such as inveterate luxations and fracture; fibrinous and purulent arthritis of different kinds, especially gonorrheal arthritis; chronic inflammations with very little or no exudate, such as chronic

arthritis deformans and dry ulcerative and adhesive arthritis; and the various forms of tubercular arthritis. The conditions which must be fulfilled in operative mobilization of the knee-joint and restoration of its function are careful selection of the material, in which important factors are the intelligence, good-will, and industry of the patient; the most careful possible opening of the joint upon an anatomical basis; the greatest possible care of the lateral ligaments and the tendinous extremities of the thigh muscles which are inserted around the joint; extreme regard for the extension apparatus as represented by the quadriceps tendon and the ligamentum patellæ, and the use of methods which will guarantee the restitution of these structures *ad integrum;* radical removal of all diseased tissue from the interior of the joint and the capsule; restoration of the joint constituents in such manner as to maintain in the best possible way the anatomical conditions, and so as to provide against a loose joint; covering over both joint ends with the amnion of the fetus and the fixation of this membrane by means of sutures to the periosteum. Careful reposition of the joint part so as to constitute a good articulation; careful closure of the wound with drainage, bandage, and such position and extension as will best accomplish the desired object. Rational after-treatment, consisting of careful movement as early as possible, first passive, then active; resistance gymnastics; gymnastic exercises without apparatus; massage; hot-air applications and faradization.

The author reports the case of a twenty-year-old girl, operated upon on account of gonorrheic ankylosis of the knee, with the result that she was able to walk, kneel, and rise without help. More than three months after the operation she reported that she was able to take long walks without a cane and also to climb hills. The muscles which were atrophic before operation had become very much strengthened. The only unfavorable symptom was that after a day's going about the foot became somewhat swollen.

## THE TREATMENT OF RUPTURED EXTRAUTERINE PREGNANCY.

SCHULTZE (*Deutsche Zeitschrift für Chirurgie,* Bd. 112, H. 1-3) states that there have occurred in the clinic of Martens in the Bethany Hospital in Berlin since May 1, 1903, 54 cases of ruptured extrauterine pregnancy, with seven deaths. Of the seven fatal cases, two should be excluded because one was dead upon admission, and the other died just as it was brought into the operating-room. Clinically the cases could be divided into those in which there was free hemorrhage into the abdomen, 32 cases with five deaths; encapsulated hemorrhage which had not extended into the pouch of Douglas, five cases with no deaths; those in which there was retrouterine hematocele, 14 cases with no deaths; and one case in which there was ovarian cyst combined with tubal pregnancy, without death.

The diagnosis of free hemorrhage into the abdomen offers difficulty in only a few cases. The most favorable prognosis is offered when such cases are operated upon as soon as the diagnosis has been made. If operation is delayed, a second hemorrhage may occur with further collapse, and the resistance of the patient be so lowered that operation may come too late.

As regards the question whether operation shall be done per vaginam or by laparotomy, there is no doubt that a great number of cases of free bleeding can be operated upon by the former as well as by the latter method. Orthmann considers the vaginal route the best, because in this way help can be given most quickly and most certainly and with the least danger. Dührssen says that the indications for the vaginal route depend first upon the technique of the operator, and secondly upon the technique of the assistant. If both these conditions are satisfactorily fulfilled, then the vaginal route should be chosen only when there is insufficient time for preparation of the patient. The author considers that for the vaginal operation the pubic hairs should be shaved and the rectum should be emptied. Even though time permitted this preparation to be carried out the process of empty-

ing the rectum is very likely to excite peristalsis and lead to further hemorrhage. Usually there is not time for such preparation. In the one case in which the author used the vaginal route fecal matter was pressed out of the anus by the speculum during operation, and the patient became infected, with a resulting abscess. In the experience of some operators the rectum has been perforated by the vaginal operation. The occurrence of postoperative ventral hernia is not infrequent following the abdominal operation. For several years the author frequently drained the abdomen, but at present he does not drain. If one is careful in suturing the abdominal wound and uses the Pfannensteil incision, not only is a fine scar obtained, but with careful asepsis one also absolutely avoids hernia. The Pfannensteil incision leaves a scar which is no more objectionable to the patient than the vaginal scar. The length of time which is necessary for the patient to remain in the hospital is practically the same with the two operative methods.

The author's method of operation consists in the Pfannensteil incision, extirpation of the diseased tube, if possible with preservation of the ovary, and careful cleansing of the peritoneum. Then the peritoneal cavity is irrigated with saline solution, and there is no hesitation about carrying the gloved hand into various parts of the abdomen in order to remove any blood which may be present. If blood-clots are allowed to remain in the abdomen, they afford breeding places for infectious bacteria, which in turn leads to adhesions between the different organs; also the process of resorption of the blood may cause sufficient autointoxication to result in paralysis of the intestine. Considering further the author's cases, 13 were sent in to the hospital with a definite diagnosis; in five of these the diagnosis was correct. In one the diagnosis was perityphlitis, in three peritonitis, in one influenza, in one peritonitis, in one appendicitis, in one catarrh of the stomach, and in one intestinal obstruction.

The diagnosis of the second group of cases, in which there is encapsulated hemorrhage which has not yet extended into the retrouterine pouch, is not so easy. These cases are always several days to several weeks old. The history is usually, apart from suppressed menses, not so characteristic as in free bleeding. The diagnosis in the five cases here reported was not difficult, and was established in three cases by the casting off of the decidua and in one case by operation, and in the fifth case, in which it was suspected, the diagnosis was finally established by operation three and a half months after the mass was first discovered. In these cases expectant treatment can be indulged in for a longer time than in other varieties. However, if resorption is delayed too long, if the mass increases in size or fever supervenes, operation should not be delayed. Of the 14 cases of retrouterine hematocele, only four were sick eight days or less before they were brought to the hospital, while the remaining 10 were sick from two to seven weeks. In many cases, because of the absence of a characteristic history and because the only physical finding was a mass in Douglas's pouch, diagnosis, in the absence of puncture, is impossible, as the condition might be either hemorrhage from extrauterine pregnancy, abscess from the genital organs or the appendix, or a real tumor of the adnexa. Of these cases six were treated expectantly, seven by vaginal incisions, and one by laparotomy, because after the vaginal puncture there occurred alarming peritoneal phenomena with collapse. Hematocele is frequently accompanied by fever, but this fever is no contraindication for laparotomy with closure of the abdomen. In all these cases, although the abdomen is closed without drainage, this should be established through the vagina. In this way the convalescence can be very much shortened.

The author's conclusions are that every ruptured extrauterine pregnancy should be operated on at once, the operation of choice being laparotomy. Encapsulated hemorrhage, which has not yet extended into Douglas's pouch, should not be too long treated expectantly, because, by the expectant plan, the convalescence is un-

necessarily prolonged. If a retrouterine hematocele is not resorbed within two or three weeks, laparotomy should be performed. The diagnosis in these cases must be made by a puncture of Douglas's pouch, and, in order to avoid infection, laparotomy is best carried out immediately on conclusion of the puncture. The danger of operation is very small.

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### A NEW OPERATION IN THE GASTRIC CRISES OF TABES.

EXNER (*Deutsche Zeitschrift für Chirurgie*, Bd. 111, H. 4-6), of Hochenegg's clinic, states that the adoption of a new method of operation for the relief of the gastric crises of tabes was suggested to him by a case in which the posterior roots of the last three thoracic nerves were resected according to the method of Förster, with the result that the patient was relieved of the attacks of pain, but there was a continuance of the vomiting. This fact appeared to him so surprising that it led him to search for an explanation. It is well known that vomiting, so far as it depends merely upon the motility of the stomach, is excited through the vagus nerve. It has been shown by experiments that vomiting can without doubt be produced through the activity of the vagus. The case in question shows that by resection of the dorsal roots the painful part of the vomiting can be eliminated without any effect upon the vomiting itself. The author was led to believe that in at least a number of cases disease of the vagus itself or of its center is responsible for the vomiting in gastric crises.

If we accept this theory, it may be presumed that the pain which is excited by the strong contraction of the stomach is precipitated by way of the posterior roots. If this hypothesis applies even to only a portion of cases of gastric crises, then our operative treatment of this condition must be modified. Our problem, then, would be not to cut the posterior roots through which the pain is conveyed, but to eliminate the primary lesion of the vagus or its center so as to avert the vomiting, in the expectation that the pain excited by the vomiting would be prevented without operation upon the dorsal roots. This hypothesis finds some support in the pathological anatomy of tabes, for we know that, in a large number of cases, affections of the vagus are observed; but it does not explain why it is that not only the pain but also the vomiting in tabetics is relieved in some cases by section of the roots, though we must take into account that the nerve distribution in the region of the thorax and abdomen is not yet fully understood, nor do we know the part which is played by individual variations in nerve distribution.

It must be considered that possibly through cutting the vagi the reflex arc, in which both the vagus and the posterior roots are concerned, is broken. For the purpose under consideration the subdiaphragmatic section of the vagi is all that is required. The question is whether this can be safely carried out upon the human being. There is evidence from numerous experiments upon animals that the vagi can be sectioned in the region of the cardiac end of the stomach without danger. It has also been shown by Völker, by the case of gastric carcinoma upon which he operated, and in which both vagi were cut in the region of the cardia, also by a case in Hochenegg's clinic in which the vagus on one side was cut, that this operation can be done on man without serious disturbance.

Physiological studies of the relation between the vagus and the stomach show that section of the vagi tends to produce an atony of the stomach through diminution in peristalsis; also that reflex spasm of the pylorus is apt to be excited because of increased secretion of hydrochloric acid. In view of these conditions the plan of operation devised by the author consists in sectioning both vagi at the cardia, and, in order to avert spasm of the pylorus, the carrying of a drainage tube through the pylorus into the duodenum. This operation the author has carried out in two cases. The first was operated upon March 1, 1911.

The last news was received from him in June, 1911, up to which time he was entirely free from either pain or vomiting. The second case was operated upon April 4, 1911. There was relief from the vomiting, but five days after the operation the tube became displaced from the pylorus and gastric atony developed. By the 13th the patient was complaining of pain similar to that he suffered before the operation. On the next day the tube was replaced in the pylorus, but the food which the patient took was continually emptied through the tube so that marked inanition developed, and, in spite of nutrient enemata, the patient died on the 25th of April. Microscopic examination of the resected portions of the vagi showed degeneration in both cases.

The author states that, although the number of his observations is small, he thinks further therapeutic researches in this direction should be made. This operation might first be carried out, and, if the pain is not relieved thereby, it could be followed by resection of the roots.

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## PRACTICAL POINTS IN THE SURGICAL TREATMENT OF EXOPHTHALMIC GOITRE.

OCHSNER (*American Journal of Surgery*, January, 1912) believes that surgical treatment should be employed in every case which does not recover permanently upon treatment with rest, hygiene, diet, and the use of a few harmless remedies; providing the patient is not suffering from temporary exacerbation of the hyperthyroidism, and, second, that the condition has not existed sufficiently long to leave the circulation and the nervous system of the patient in an absolutely hopeless condition. He believes that drainage is an important means of preventing possible postoperative hyperthyroidism. Unnecessary trauma should be most carefully avoided, the greatest care and gentleness being employed. He advocates as an anesthetic morphine-atropine half an hour before operation and ether by the drop method, the table being elevated. Immediately after the operation the patient is supplied with an abundance of liquid in the form of hot water taken by the mouth, or normal salt solution taken by enema; or if neither of these methods can be applied, by injecting normal salt solution into the tissues beneath the breast. It is extremely important to direct the patient's life after operation so that overwork, excitement, alcohol, tobacco, tea, coffee, business and social worries are absolutely avoided. The diet should largely be composed of milk, cooked vegetables and fruits, favorable hygienic surroundings, and absence of conditions which might cause nervous excitement. Attention is called to the fact that youthful patients usually recover without operation with physical, mental, and emotional rest, diet of cooked vegetables and fruits, and an absence of conditions which might cause nervous excitement.

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## THE INCISION FOR LUMBAR EXPOSURE OF THE KIDNEY.

DR. WILLIAM J. MAYO (*Annals of Surgery*, January, 1912) notes that the twelfth rib is the chief obstacle to proper exposure of the kidney; that in cutting this rib far back the pleura is not infrequently injured. In 203 lumbar incisions it was found necessary to cut the twelfth rib in 51 cases, and in 13 of these the pleura was accidentally opened, with no further complication or accident of any kind, the lung not collapsing even when the rent in the pleura was so large that it could be seen easily when it advanced in the act of respiration. This he attributes to the fact that the patients were lying nearly flat on the abdomen, with moderate elevation of the lungs, this position serving to fix the chest so that if the pleura be opened at the extreme lower part collapse of the lung does not often occur. The pleural cavity was not infected in any of the cases, since the opening was immediately closed by catgut suture, which took in the margin of the diaphragm, the cut pleural margins, and the posterior muscles.

In a number of cases during the past two years, while exposing the posterior half of the twelfth rib for the purpose of division, the writer observed that as soon as the

muscular and fibrous attachments, especially the quadratus lumborum and the lateral arcuate ligament, which binds the twelfth rib to the transverse process of the first lumbar vertebra, were divided the necessity for rib division disappeared. By putting a retractor under the angle of the twelfth rib, the upper margin of the incision, including the rib, was so mobilized that exposure of the kidney and especially of the kidney pedicle was quickly accomplished. The pleura was easily pushed upward and not opened. In two of the cases, when the costal margin could not be sufficiently mobilized, the twelfth rib was broken with a lateral twist and pull of the hand, causing an incomplete fracture within its periosteal and muscular coverings near the neck, and in one very obese patient the rib was cut.

In some cases the twelfth rib is absent or rudimentary, but this is quite immaterial so far as the advantage to be gained from the high posterior cut is concerned. The incision is made as follows:

Beginning at a point two to two and a half inches lateral to the dorsal spines near the outer margin of the erector spinæ muscle, a longitudinal incision is made two to three inches in length through the skin, superficial fascia, and posterior layer of the lumbodorsal fascia (vertebral aponeurosis) which covers the erector spinæ muscle. The incision lies behind the twelfth rib from the angle, if present, nearly to the head, and reaches downward to a point one-half inch below the angle. From this point the incision passes obliquely downward and forward along the anterior margin of the quadratus lumborum muscle to a point an inch above the crest of the ilium, and there turning runs forward parallel to the iliac crest as far as necessary.

The posterior superior lumbar triangle (Kelly) just beneath the twelfth rib is then exposed by cutting an opening through the external and internal oblique, transversalis, and latissimus dorsi muscles, exposing the transversalis fascia in its lumbar portion. This fascia is then opened freely, exposing the perirenal fat. The ilioinguinal and iliohypogastric nerves are identified and retracted out of harm's way and the lower part of the incision completed. The twelfth rib is then cleared in its posterior portion upward and backward nearly to the articulation of the rib with the transverse process of the twelfth dorsal vertebra, and the pleura pushed upward. By retracting the erector spinæ muscle on the one hand and the costal margin on the other, a wide exposure is accomplished at the point of previous inaccessibility. As a rule the kidney can readily be drawn through the incision to the surface with but little traction. The incision is easily closed and there is little or no danger of hernia.

The incision herein described varies from the ordinary lumbar incision only in relation to the exposure above and behind the curve or angle of the posterior half of the twelfth rib.

In operating upon kidneys which are not greatly altered in size, or in which the alteration in size is due to fluid contents which can be evacuated, Mayo prefers the lumbar incision.

For those tumors of the kidney which present themselves as a distinct abdominal mass the anterior transperitoneal incision is best.

An extended search of the literature of incisions of lumbar exposure of the kidney has not been made, but the method is so efficient and sensible that it is probably one of the old good things which has been forgotten.

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## THE ROUTINE USE OF SPINAL ANESTHESIA.

RICHARDS (*British Medical Journal*, Dec. 23, 1911), on the basis of 500 consecutive cases, contributes a paper in which it is shown that the anesthesia was unsuccessful in 12 cases because of failure to make proper penetration with the needle, and resulted in death in three cases. The first fatal case was a man of ninety, with enlarged prostate; the second a man of forty-five, with a suprapubic fistula; the third a man who suffered from crushed leg. In all three cases the lesions found post mor-

tem were enough to account for death aside from the anesthetic used.

As to the nature of the operations, there were 177 herniotomies and 102 operations on the bladder, of which 8 were prostatectomies; most of the remainder were lithotrities and a variety of procedures involving the pelvic region and the lower extremities. The author considers the technique very simple and says that it requires no special skill. All the anesthetizing solutions can easily be procured sterilized in glass bulbs or ampoules. It is a matter of indifference through which lumbar space the injection is made, so it is best to choose the one which seems easiest. It is easier to go just to one side of the middle line to avoid the supraspinous ligaments, and it should be an absolute rule not to inject the anesthetizing solution except while cerebrospinal fluid is actually dripping from the needle. Faint staining of this fluid with blood does not matter. The dripping of pure blood means the needle is in the posterior spinal venous plexus. Drawing spinal fluid into the syringe to mix with the solution gives additional security that the needle is rightly placed, but has no other advantage, and the rate of injection seems to make no difference in the anesthesia produced. A fairly common blunder is to disconnect the needle from the syringe before withdrawing it; this allows some of the injection to escape. The puncture needs no dressing. The syringe and needles must be sterilized by boiling in water and not in soda solution, as even a trace of alkali decomposes the solution.

Aside from the failures in administration (12 attributed to the fact that the needle did not reach the proper point), there were complete anesthetic failures in 38 cases, although the injection was apparently successful. Some cannot be explained. Some were due to improperly prepared solutions. There were partial failures in 18 cases. In a fair number of cases some depression followed the onset of anesthesia. The patient yawns, complains of feeling sick or giddy, and very commonly asks for a drink of water. In a few this is marked enough to require brandy or strychnine. This stage only lasts for a few minutes, and then the patient settles down into a condition of mental and bodily comfort, which lasts till the operation is over.

Altogether there were 16 cases of vomiting, seven of nausea, and five of faintness sufficiently marked to be noted. If the patients had not had a preliminary purge their bowels were often opened on the table simply from relaxation of the sphincter. In over 80 per cent of cases there were no after symptoms of importance. The commonest complaint was of pain in the head or back; in 54 cases this lasted for two days, and in 27 for three or more days, and was in some instances severe, so that the proportion of serious backache and headache was considerable. These symptoms occur in the same degree in nearly 40 per cent. In three severe cases lasting relief was produced in a few minutes by lumbar puncture.

The solutions used included novocaine, stovaine, tropacocaine, stovaine-glucose, and stovaine-adrenalin. Richards believes that spinal analgesia looked at broadly is no better than chloroform. It is, however, quite simple for the surgeon working single-handed to produce anesthesia by the spinal method and then operate at ease, with an occasional question or glance at the patient's face. The use of stovaine reaches a fair level of efficiency in inexperienced hands, and its dangers are negligible as compared to those which are experienced by a patient in the hands of a confident and inexperienced chloroformist, or to those which are present when chloroform is given fitfully by the operator or by a layman. Another advantage of stovaine in the case of patients of poor vitality is that, instead of preliminary purging and fasting, and subsequent nausea, the patients can be fed at any time up to, during, and after the operation.

The muscular relaxation obtained with stovaine is more marked than with deep chloroform anesthesia. The sphincter ani becomes so flaccid that motions are often

passed on the table, unless the rectum has been previously emptied. Anal operations are rendered much easier, and the sphincter requires scarcely any stretching. In the same way a bladder which is contracted and irritable often gives rise to a good deal of trouble and delay under chloroform, the chloroform having to be pushed before the bladder can be adequately filled. The abdominal muscles harden over it, and it is not easy to tell if the resistance to distention is an active or passive one. With stovaine a bladder of this kind dilates at once to its maximum size under quite a low pressure.

For setting fractures the difference between the two is less, but is still in favor of stovaine.

When a large number of cases have to be dealt with, spinal anesthesia saves a good deal of time, not only in administration, but also because, if the list is finished unexpectedly early, other waiting cases can be added to it without preparation. If there is much work or many emergency cases, it sometimes happens that minor cases, such as hernias or hydroceles, are prepared two or even three days in succession and left over for want of time. This is very trying for the patients, and can be avoided by using stovaine.

Its disadvantages are considerable. In the first place, it is not absolutely trustworthy. Under the conditions described above there were over 10 per cent of partial or complete failures, and if it is necessary to have a chloroformist in waiting in case the stovaine does not work, its chief advantage for general use is gone. Possibly this estimate is too pessimistic, and when no anesthetist is available, it is at any rate 9 to 1 on stovaine saving the situation. And where two men are available it is better to have an assistant, with a 1-in-10 chance of his ending up as an anesthetist, than to devote him to that duty from the start.

Again, the anesthesia fails where it is necessary, as in abdominal work, to extend the operation higher than was anticipated, but in the class of cases which compose this series this question does not arise.

The dosage cannot easily be varied in the course of an operation; it can be adapted beforehand to the patient's age or size, but not to his idiosyncrasy. In order to reach the necessary level and full degree of anesthesia, a dose must be given which will produce an effect lasting about an hour, even if the operation is going to be over in ten minutes. As a matter of fact, increased duration of the anesthesia does not seem to involve any increased tax on the patient's strength. The patients fail, if they fail at all, at the beginning of the anesthesia, and apart from loss of blood improve toward the end. Of course, an overdose of chloroform can be checked by stopping its administration, while an overdose of stovaine goes inevitably on. But actually the risk of an overdose is probably less with stovaine than with chloroform; one is dealing with an exact quantity of a pure drug, whereas with chloroform given on a mask the amount which enters the patient's system bears no constant relation to the quantity dropped from the bottle, and can only be roughly guessed at from the effects it produces. The rate of administration, which is so important with chloroform, also plays no part in spinal anesthesia; so that, though the original administration admits of no adaptation afterwards, the state of the patient is the only factor not accurately known and controlled. Giving chloroform is an art; giving stovaine is a scientific experiment.

To sum up, it is clear that spinal anesthesia, owing to its limited field, can never replace chloroform. If we are to be limited to one method, that must, of course, be general anesthesia. But in the ground common to both, there is not a vast difference between the two methods in ease, safety, and effectiveness, if these are taken together over a large number of cases. What there is, is slightly in favor of general anesthesia. Yet in a number of cases spinal anesthesia offers advantages which cannot be got in any other way, and its apparatus and technique are so simple that

it is worth any surgeon's while to use it whenever there is anything definite to be gained by it. In the large number of cases where there is nothing to choose between the methods, the use of stovaine becomes a matter of taste and convenience.

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### TREATMENT OF NOMA WITH SALVARSAN.

NICOLL (*Archives of Pediatrics*, November, 1911) states that during the spring and early summer of the present year there occurred an unusually large number of fatal cases of noma in the city of New York.

At the Scarlet Fever Hospital of the Department of Health there were 11 cases and 9 deaths. So much confusion exists in the nomenclature of the various ulcerative conditions about the mouth, especially in children, that it would seem expedient to arrive at some understanding as to what pathologic condition may properly be termed noma. Thus, small ulcerations occur on the inner surface of the cheek from which smears show the presence, often in great numbers, of the characteristic fusiform bacilli and spirochætæ, but which, nevertheless, readily yield to the application of caustics or milder local remedies. Other cases, not to be differentiated bacteriologically from the latter, do not yield to treatment, the ulceromembranous process extending with startling rapidity to the gums and then to the neighboring alveolar process of the jaw. Again, marginal ulcerations about the teeth, together with a spongy condition of the gums, yield similar bacteriologic findings, but in otherwise healthy children do well under treatment by local applications.

The so-called Vincent's angina, in spite of very widely extended lesions, usually produces but few general symptoms, and, after a somewhat tedious local treatment, runs a favorable course without extensive loss of tissue.

For the purpose of these observations, the term noma is to be understood as designating a rapidly-spreading gangrenous process, beginning usually on the mucous membrane of the cheek and gums and involving all surrounding tissues, including bone, showing little tendency to self-limitation, and from which fusiform bacilli and spirochætæ may be obtained in great numbers in the smears.

Observations of this disease, extending over many years, especially at the New York Foundling Hospital, together with the study of most of the 11 cases referred to above, justify the writer in arriving at the following general conclusions:

The disease is essentially one of contagious disease hospitals and institutions for young children, but few typical cases having been reported from other sources.

It is very largely confined to children under five years of age.

It attacks almost wholly those suffering from marked malnutrition, and whose resistance has been lowered as a result of previous disease.

Measles has long been regarded as one of the predisposing causes. In the 11 cases mentioned, four had an antecedent attack of measles during their convalescence from scarlet fever.

During the occurrence of an epidemic of noma a large number of minor ulcerative or ulceromembranous conditions are found about the mouth and gums in otherwise healthy children, showing the same organisms as those found in true noma, but showing little tendency to spread.

In the epidemic at the Scarlet Fever Hospital there was no positive evidence of direct contagion, the cases being scattered over five floors of the building.

Occurring, as it does, in patients in a low state of nutrition, the disease shows little tendency either to spontaneous recovery or to yield to local treatment, or even be influenced by radical surgical measures —curetting and removal of diseased tissues. Occasionally a sequestrum of dead bone is formed, sharply marked off by healthy tissue, and spontaneous healing occurs. In the 11 cases mentioned, one took this course —that which occurred in a patient in previously fair general health. In another the same process was seen after treatment by

salvarsan. The other nine died after treatment which varied from the application of strong caustics, and frequent cleansing of the parts, to removal, under an anesthetic, of all the visible diseased tissue, including bone. It cannot be said that radical measures had any apparent effect on the progress of the disease—indeed, in some cases they seemed to act adversely.

In conclusion, it would seem advisable, even in the absence of positive evidence that spirochætæ are the specific organisms of noma, to make use of salvarsan in every case which does not immediately yield to local treatment, for it cannot be denied that other remedies have had little or no effect in controlling this horrible disease, and the use of salvarsan is at least logical.

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## JEJUNAL AND GASTROJEJUNAL ULCERS.

Mayo-Robson (*British Medical Journal*, Jan. 6, 1912), after observing that he believes that this disease occurs much more frequently as a sequel of gastroenterostomy than the profession is quite willing to acknowledge, states that his own operative experience extends to seven cases, all of which have followed operations by surgeons whose technique is beyond reproach. The cause of a jejunal ulcer seems to be an excessive acidity of the gastric juice, from which it is argued that great care should be exercised after the operation of gastrojejunostomy in dieting patients, since hyperchlorhydria and sepsis combine to produce ulcers. It is further urged that absorbable material should only be used for the marginal suture.

The symptoms of gastrojejunal ulcer are quite similar to those of a gastric or duodenal lesion. There is hunger pain, relieved by eating and by alkalies. The pain often occurs to the left of the umbilicus, and is associated with marked tenderness and rigidity of the left rectus. Diagnosis is made fairly certain by blood; but if with all these symptoms a swollen and tender loop of bowel can be felt in the region of the anastomosis, or below and to the left of the umbilicus, there can be no further doubt as to the nature of the disease. In regard to treatment, gastroenterostomy should not be performed unless the mechanical indications for the operation are clearly demonstrable, nor should the medical aspect of the case be neglected after the operation. If a jejunal or gastrojejunal ulcer has been diagnosed and does not yield to medical treatment, section must be made so that the jejunum can be examined at or near the point of anastomosis.

If the ulceration is at the gastrojejunal anastomosis or in the jejunum, and the original ulcer at the pylorus or in the duodenum has healed, the jejunum may be detached from the stomach, the ulcerated area excised, and the openings in the stomach and jejunum closed.

If the pyloric or duodenal ulcer, in healing, has led to stenosis, an anastomotic opening cannot be spared, and either a new site for the gastroenterostomy must be selected on the posterior wall of the stomach, or an anterior gastroenterostomy after Roux's method may have to be done after closing the original opening.

If the ulceration is jejunal, and the area involved extensive, the diseased part of the jejunum may have to be excised, and according to the healthy condition or otherwise of the duodenum and pylorus, the healthy jejunum may be united end to end and the stomach opening closed, or a new gastroenterostomy may be performed at a fresh site.

Should the jejunal ulcer be distinct, and the margin of the anastomotic opening be found healthy, it may be advisable to excise the ulcer and to repair the bowel without excising the jejunum more extensively, and without interfering with the anastomotic opening.

Should the patient be profoundly ill and unable to bear a prolonged operation, a loop of jejunum some inches below the disease may be brought to the surface, and the operation of jejunostomy performed. Through a tube introduced into the jejunum the patient can be fed, and the ulcerated area, whether jejunal, duodenal, or gastric, can be put at complete rest until

healing is effected, when the artificial opening can be allowed to close.

The author states that he feels sure that this operation of jejunostomy has not received the attention it merits, as in extreme cases he has found it most safe and useful. He has employed it in hematemesis where the bleeding point could not be found, in chronic ulceration with great thickening, as in plastic linitis, and in chronic perforation, where the parts were hopelessly matted, and the patient was unfit to bear a prolonged operation.

But the operation of jejunostomy may be found useful in all conditions where it is necessary to give the stomach complete rest for a time, whether the disease be in the stomach or duodenum, and he believes that in many cases of ulcer near the cardiac end of the stomach, or along the lesser curvature, as also in some ulcers of the duodenum that have failed to yield to medical treatment, the operation of jejunostomy, if there is no pyloric stenosis, will come to be the operation of choice, as by its means the patient can be well fed for months without a particle of food being allowed in the stomach, thus giving the ulcer, whatever site it may occupy, absolute rest and freedom from irritation. After a period, when healing of the ulcer or ulcers has resulted, the small tube can be left out, and the minute opening will close voluntarily.

The writer states that if he were speaking only from theory he should hesitate to advance these opinions, but an extensive practical experience both of gastrojejunostomy and of jejunostomy enables him to speak with confidence in stating his views.

The operation he has performed consists in taking a loop of the jejunum well beyond its origin, just sufficiently long to reach the surface without tension. A small incision is then made into the top of the loop large enough to admit a No. 12 Jacquet catheter, which is inserted and passed for fully three inches down the distal arm of the loop. This is fixed to the margin of the incision in the gut by a silk or thread suture, and the entrance of the tube into the bowel is further secured by two purse-string sutures one over the other. The top of the loop is fixed to the parietal peritoneum and posterior aponeurosis by two stitches and the wound closed around the tube. The patient can then be fed at once with egg, milk, and a little brandy. The whole operation can be done in from ten to fifteen minutes, and with no shock and very little visceral exposure.

As a further precaution, the loop may be short-circuited, but this is not absolutely necessary, and, should the patient be seriously ill, the short-circuiting is undesirable.

For the operation to be a success the bowel must be placed so that it will serve two purposes: (1) To permit the passage onward of the bile and pancreatic fluid poured into the intestine above the artificial fistula; and (2) to allow of food being introduced into the fistula without fear of regurgitation either of the food or of the intestinal contents.

The feeding is done by means of a funnel and tube that will slip over the catheter, and it can be repeated every four hours, or more or less frequently, according to the requirements of the case.

The operation will be found useful in the following conditions:

1. Wide-spread cancer of the stomach too advanced for gastrectomy and too extensive for gastrostomy. By securing complete rest to the stomach, it stops hemorrhage, relieves pain, diminishes the size of the tumor, and prolongs life very considerably.

2. In general cicatricial contraction of the stomach, due to the swallowing of caustic fluids, in which the stomach has been so far damaged that it no longer performs its functions or even allows of the passage onward of food.

3. In chronic ulcer of the stomach giving rise to hemorrhage, pain, or vomiting, and to malnutrition; and where the patient is too ill to bear partial gastrectomy, which can, however, be subsequently done if thought needful after the patient's condition has been restored by adequate feeding.

4. In some cases of chronic duodenal ul-

cer, associated with hyperchlorhydria, in which there may be a fear of jejunal ulcer subsequently developing if gastroenterostomy be performed.

5. In certain cases of duodenal ulcer in very stout subjects in which it is extremely difficult to perform a posterior gastroenterostomy, and in which violent hemorrhage has only recently occurred and may be again excited by dragging on the stomach.

6. In jejunal or gastrojejunal ulcer where the patient is thought to be too ill to bear one of the extensive operations previously mentioned; or where, the disease being slight, it is thought that the complete rest to the stomach and upper jejunum that can be given by a jejunostomy will at the same time relieve the hyperchlorhydria and cure the ulcer. Neumann has, in fact, suggested the operation for hyperchlorhydria alone.

7. In recurring hematemesis failing to yield to ordinary treatment, and where on exploration no ulcer or other removable cause can be discovered.

8. In persistent vomiting threatening life, as in the severe and sometimes fatal vomiting of pregnancy, when no food whatever can be retained in the stomach.

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## OPERATIVE TREATMENT OF FRACTURES.

Bartlett (*American Journal of Surgery*, January, 1912) reports that of 80 cases treated, it has been possible to secure the results in 53 instances. In summing up these results we find that bony union is known to have occurred 46 times out of the 53; that non-union resulted five times; three patients died (one of these died of heart failure; the bony union had already resulted).

As a result of the experience gained in the 80 cases summed up in this paper, Bartlett has the most unqualified enthusiasm for the open treatment of fractures in properly selected cases. Too great emphasis, however, cannot be laid on the importance of the proper selection of cases, as shown throughout this discussion. The statistics given demonstrate exactly what has been accomplished. The results of the next 80 cases will be much better, as experience plays a wonderful rôle in this class of work.

The number of plates in which secondary removal was necessitated inevitably leads to the conclusion that smaller and lighter plates must be used if a tissue tolerance to them is to be cultivated. However, removal of a plate is a matter of comparatively slight significance when restoration of anatomical and functional perfection is considered. Removal of wires, nails, or pins is not needful where aseptic healing had been effected.

Nothing short of absolutely perfect approximation justifies an open operation for fracture. By this is meant a union so exact that no fracture line can be seen by spectators a few feet away from the field.

An ideal result is possible even when Lane's plates are used in the presence of pus, as shown by one case.

The mortality here shown of three in eighty can be still further reduced by more discrimination in the material chosen. The author lost one alcoholic from pneumonia eight days after plating a clavicle, and a second in delirium tremens fifteen days after the same treatment of a femur; the conclusion is obvious. His third death occurred suddenly as the patient was about to be discharged, apparently cured.

His experience shows him that for practical purposes one must regard the bone plate as highly useful in fixing fragments only until external splints have been applied. He has seen screws become loose where motion inside of the cast was possible, something especially true of the femur or humerus. There can be no doubt that a better prognosis can be given for a thin than for a fleshy person so treated.

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## URETERAL GRAFTS.

Chiasserini (*Lancet*, Nov. 25, 1911), as a result of an experimental research in which sections of blood-vessels were employed to establish the continuity of the divided ureters, noticed that there is a possibility of the vessel ends between the

two ureteral ends becoming firmly united to them. The piece transplanted becomes shortened a few days after the operation, so as to draw the two ureteral ends nearer together. The graft becomes thicker and hard, while the lumen is nearly obliterated. The stenosis causes a stoppage in the flow of the urine with consecutive dilatation of the canal of the ureter and hydronephrosis.

The author holds it as certain that vascular grafts cannot be used to replace a segment of the ureter.

# REVIEWS.

DIFFERENTIAL DIAGNOSIS. By Richard C. Cabot, M.D. Second Edition, Revised. Illustrated. The W. B. Saunders Company, Philadelphia, 1912. Cloth, $5.50.

As many of our readers know, this method of presenting the subject of diagnosis, by the description of a large number of more or less typical cases, is practically original with Dr. Cabot so far as the compilation of a volume dealing with clinical medicine is concerned, although there have been books equally good which have dealt with symptomatology and diagnosis in such a way as to lead from the symptoms of the patient to the name of the disease. After an introductory chapter of about twenty pages, the author deals with pain and its diagnostic value; then with headache, lumbar pain, general abdominal pain, epigastric pain, pain of the right and left hypochondrium, the two iliac regions, the arms, the legs, the feet. The rest of the book deals with the symptomatology of fevers, chills, coma, convulsions, vomiting, dyspnea, bloody urine, jaundice, and nervousness.

Those who have possessed themselves of the first edition know full well that the author has been successful in clearly describing the symptoms which are necessary to diagnosis. The present edition has been carefully revised, and we are told in its preface that additional symptoms will be dealt with in a second volume along the same lines. Occasionally the author resorts to diagrams to illustrate clearly the relative frequency of various diseases and various symptoms, as, for example, that showing the causes of right iliac pain.

Diagnosis based upon statistical frequency is of course unreliable, but nevertheless statistical frequency is one of the factors which must always be considered. That there are faults in this method of presenting diagnosis cannot be doubted. Thus, the importance of vomiting as a symptom is hardly represented by the diagram on page 609, at least in the sense of giving us any aid which will help us materially in reaching a conclusion. According to this diagram, by far the most frequent cause of vomiting is "gastric neurosis." The next most frequent is acute appendicitis, and next cardiac disease, when, as a matter of fact, we all know that the vast majority of cases of vomiting are due to digestive disorders which do not depend upon any of these causes. It is in this respect that the book may mislead the inexperienced, although of course it will not have this effect upon the qualified practitioner of several years' standing. The same criticism holds true in regard to the description of the causes of jaundice. According to this, gall-stones are the cause of jaundice three times as commonly as catarrhal jaundice. While it is true that jaundice is, in many instances, due to organic disease, the belief on the part of the practitioner that in each case of jaundice there are three chances to one that the condition is due to gall-stones would be erroneous. Then, too, it causes one to lose sight of the fact that gall-stones usually do not cause jaundice.

The book is very copiously illustrated with plates, nearly all of which are excellent. It is valuable collateral reading for the student and interesting general reading for the practitioner, who will pick up in its different pages many useful points

in diagnostic methods. These criticisms in no way detract from the value of the volume, the success of which is already assured.

SEX HYGIENE FOR THE MALE AND WHAT TO SAY TO THE BOY. By G. Frank Lydston, M.D. Illustrated. The Riverton Press, Chicago, 1912.

The author of this book on Sex Hygiene is recognized by every one who knows him as a most vigorous and pungent writer, and therefore the expectations which are aroused on being given a book from his pen do not fail of realization when these particular pages are perused. In his introduction Dr. Lydston, as so many other writers on this subject have done, emphasizes the need of giving adequate sexual instruction to both young men and young women. As an illustration of the vigorous way in which Dr. Lydston presents his subject, we may quote the following thirteen word pictures which he paints:

"Picture 1. A certain health resort—the sink-hole into which a large part of the immorality, crime, and disease of America is dumped—there are a hundred thousand visitors annually. Of these, a large proportion go there to harvest their 'wild oats' crop. He who visits one of the government 'rale holes' can best appreciate the harvest of the 'wild oats.'

"Picture 2. A hospital. Here is a group of locomotor ataxics; there a group of deformed children; yonder, a girl in her teens is nursing a child who never will know its father. More 'wild oats.'

"Picture 3. An asylum. Here is a case of general paresis; there a melancholiac; in the next room a maniac can be heard shrieking. 'Wild oats' aplenty.

"Picture 4. A police court, full of drunks, criminals, and bums. 'Wild oats' again.

"Picture 5. A jail. Here are 'wild oats' of the striped, short-haired variety in abundance.

"Picture 6. A foundling asylum full of children cursed by society before they were born as 'bastards.' Poor little 'wild oats.'

"Picture 7. A doctor's office, full of anxious men and still more anxious women, who do not gossip much about their ailments, even among their intimates, save when the women are told by the doctor a pretty little fairy tale for home use. 'Wild oats' growing in the dark.

"Picture 8. A brothel. Around the 'reception' room sits a collection of poor female creatures, many of whom were originally sacrificed in aiding youth to sow its 'wild oats.' These women are now getting poetic revenge, as the doctor knows.

"Picture 9. A beautiful girl is found dead in the river one fine morning. What is she doing there? Washing the 'wild oats' out of her life.

"Picture 10. A pistol shot rings out in a gambling hell—a man falls dead. The gun was loaded with 'wild oats.'

"Picture 11. A defaulting bank cashier flees to Canada; he is looking for a market for his 'wild oats.'

"Picture 12. A series of deserted babies are found in the snow. Who planted them there? Sowers of 'wild oats.'

"Picture 13. A wife, surrounded by her cold and hungry children is sitting weeping—eating her heart out. The husband and father is on a drunk; he has whipped her, is in jail, or has deserted her. 'Wild oats' make broken hearts; they are poor food for babies; they do not buy coal, nor cover nakedness."

Much valuable advice is given in regard to athletic exercise, the anatomy and physiology of the sexual apparatus, and diseases of the genito-urinary system are described in a manner which may readily be understood by the parents and also by the youths who are given access to these pages.

DISEASES OF THE GENITO-URINARY ORGANS AND THE KIDNEYS. By Robert Holmes Greene, A.M., M.D., and Harlow Brooks, M.D. Third Edition, Revised and Enlarged. Illustrated. The W. B. Saunders Company, Philadelphia, 1912. Price $5.00.

Here we have a volume in which a surgeon and a medical clinician have joined hands in the preparation of the text. In the past such attempts have often proved to be failures, but in this instance the authors have worked together with consistency and their views may be said to be

practically never contradictory. That the book has proved useful is shown by the fact that three editions have appeared in five years. The opening chapters deal with the various methods, instrumental and otherwise, of examining the genito-urinary tract. Then follows a chapter upon diseases of the kidney, and one upon the blood in diseases of the kidney, and still another upon the ocular manifestations of renal disease. Special chapters then follow upon the kidney and acute infectious diseases, upon uremia, upon malformations and displacements, wounds and injuries of the kidneys, renal calculus and tumors of the kidney. The sixteenth chapter deals with the surgery of the kidney. The remaining chapters deal with the anatomy, physiology, and pathology of the bladder and the lower genito-urinary tract.

The book is printed in large type on heavy paper, is handsomely gotten up, and without doubt will prove of great value, not alone to specialists in this department of medicine and surgery but to the general practitioner, who, with the aid of the illustrations which are found on almost every page, and by a careful perusal of the text, can obtain safe and sane directions as to the methods which should be employed in the treatment of diseases of the genito-urinary tract.

MODERN METHODS IN NURSING. By Georgiana J. Sanders. Illustrated. The W. B. Saunders Company, Philadelphia, 1912. Price $2.50.

If it is true that "of the making of books there is no end," it would seem to be still more true that this particular aphorism holds as to the preparation and publication of books intended for nurses, for within the last few years no department of medical literature has been so well supplied with new volumes as that dealing with the duties of the trained nurse. The present volume seems to be an excellent one. It embodies not only the experience of a nurse, who has been a graduate and superintendent of nurses for many years, but also a large amount of information which is derived from current medical text-books and dietaries. All together there are twenty-four chapters in the book, with an appendix devoted to recipes. There can be no doubt that the work is well done, even though it be true that a very large field is covered. After discussing the choice of a training school, the qualifications of a nurse, the commercial valuation of nursing and the school course, the writer takes up beds and bed-making, baths and packs, local applications, the various methods which are employed in medication or treatment by way of the rectum, and then studies the temperature, pulse and respiration, and indicates the duties of a nurse in training her powers of observation and examination. Bandages and splints, medicines and doses, poisons and their antidotes, elementary bacteriology and theories of immunity are next discussed, and then the various methods of surgical technique employed by the nurse when assisting the surgeon, or when acting for herself, are described. We would advise medical men and directresses of training schools to examine this book before making a decision as to the best one for the pupil nurses in training.

A CYCLOPEDIA OF AMERICAN MEDICAL BIOGRAPHY. Comprising the Lives of Eminent Deceased Physicians and Surgeons from 1610 to 1910, by Howard A. Kelly, M.D. Illustrated with Portraits. Volumes I and II. The W. B. Saunders Company, Philadelphia, 1912. Price $10.00.

For a number of years many of Dr. Kelly's friends have been aware of the fact that he was preparing this very large work in an endeavor to put in permanent and accurate form a record of the lives and accomplishments of medical men. In a very large number of instances the biographical sketches have been written by men who by reason of relationship, the possession of historical documents, or their interest in medical history are well qualified to prepare the text. In addition to these authors an even larger amount of work has been done through Dr. Kelly having organized a corps of colaborers who have taken charge of different sections of the country. A list of these colaborers is printed in the preface. The introductory pages of the first volume

cover seventy-five pages and deal with preliminary historical matter as to anatomy, surgery, gynecology, obstetrics, and the various specialties, including medical jurisprudence, the design being to show what medical men in America have accomplished in general terms. .

It is manifestly quite impossible in a review of this kind to dissect the text or to criticize the individual biographical notices. The book is sure to become a classic in American medical literature, not only because of the theme with which it deals, but also because the text has been prepared with infinite care and is wonderfully accurate, particularly when we consider the long period of time which it covers.

PELLAGRA. An American Problem. By Dr. George M. Niles, M.D. Illustrated. The W. B. Saunders Company, Philadelphia, 1912. Price $3.00.

The comparatively recent recognition that pellagra is a very common disease in the Southern portion of the United States, and that it occurs more frequently than many imagine in the Middle States as well, renders this volume an exceedingly timely one, even although some of the problems as to its causation and manifestations still need much investigation. The present book adequately and completely discusses the various theories and facts which are new concerning this curious disease, and includes chapters dealing with the treatment and prophylaxis of the malady. The other chapters, which will prove most interesting to the general practitioner, are naturally those which deal with the diagnosis and symptomatology of the disease. In view of the fact that the subject is a recent one, the author has seen fit to append a copious list of names of those who have made contributions to its study. It is a pity, however, that this list is not, strictly speaking, a bibliography but only a "Namen-register," since the numbers after the proper names only refer to the parts of the text in which the name is mentioned, and no information is given as to title under which, or journal in which, the literature can be found. This omission, however, in no way diminishes the value of the book to any one except he who may be seeking to make an exhaustive study of the disease.

IMMUNITY: METHODS OF DIAGNOSIS AND THERAPY AND THEIR PRACTICAL APPLICATION. By Dr. Julius Citron. Translated from the German and Edited by A. L. Garbat, M.D. Illustrated. P. Blakiston's Son & Company, Philadelphia, 1912. Price $3.00.

The scope of this book is well defined in its title. It is not so much intended for laboratory workers as for clinicians, and in the language of the author is meant to serve a purely practical purpose. He has therefore endeavored to prepare a short text-book which would review in a purely medical form the various methods of immunity diagnosis, with especial reference to tuberculosis and syphilis. He deals therefore with methods diagnostic, therapeutic, and prophylactic, and as he has been a worker under Wassermann himself he is well qualified to prepare the text. The book has been very favorably received in Germany, and the American translator has carefully revised the chapter on Vaccine, having in turn been a worker under Wright. Those who wish to keep abreast of advances along these lines, and all of us certainly have this wish, cannot do better than obtain this book, which is concise, clear, and to the point.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by Leighton F. Appleman, M.D. Volume I, March, 1912.

The March issue of Progressive Medicine contains, as it has done in previous years, articles which afford a complete summary of the progress of medicine during the past twelve months in the following important departments of medicine: The surgery of the head, neck, and thorax is considered by Dr. Charles H. Frazier in an article of a little more than one hundred pages; the infectious diseases, including acute rheumatism, croupous pneumonia, and influenza, by Dr. John Ruhräh in an article of one hundred and twenty-four pages; diseases of children by Dr. Floyd

M. Crandall in thirty-two pages; rhinology and laryngology by Dr. D. Braden Kyle in an article of fifty-two pages; and one by Dr. Arthur B. Duel, of New York, on otology which covers thirty-eight pages. It has been well said that the collaborators of Progressive Medicine are well chosen in that they are competent not only to sum up the literature of the year, but to increase its value by their personal suggestions and criticisms.

THE PHYSIOLOGY OF THE SEMICIRCULAR CANALS AND THEIR RELATIONSHIP TO SEASICKNESS. By Joseph Byrne, A.M., M.D., LL.B. J. T. Dougherty, New York, 1912. H. K. Lewis, 1912.

With the great mass of literature which presents itself for study from week to week and month to month it is somewhat appalling to be brought face to face with a volume of 569 pages devoted to a subject as limited as that named in the title of this volume. That there is a definite relationship between the semicircular canals and the nausea and vomiting which is produced by the movements of a ship seems to be pretty well proved. The first 338 pages deal with the physiology of the semicircular canals, and about 190 pages are then devoted to studies in seasickness, while the last pages of the book contain no less than 288 references to the bibliography of seasickness and to that of the semicircular canals, and a copious index as to subjects and names. Those who are interested in this subject because they are going to sea, and medical men attached to ocean-going vessels, would do well to make a careful study of Dr. Byrne's book.

HOME HYGIENE AND PREVENTION OF DISEASE. By Norman E. Ditman, M.D. Duffield & Company, New York, 1912.

The text of this volume is a curious mixture because of its alphabetical arrangement. The opening pages deal with abscess, acidity of the stomach, and atony. Then follows asthma, babies lost by overlaying, banting, and bathing. It seems to be a book intended for the shelf of the man or woman who goes on the principle that every one should be his own doctor. Under the heading "Hanging" occur the following words: "If ever you come across a person who has hanged himself or herself, or has been hanged by some one else—that is, if you see a body hanging by the neck—get a knife or scissors and cut the body down."

That the ground which the author has covered is a wide one is shown by the fact that in a page and a third which is devoted to training, a brief summary of a day's training for the boat races of Cambridge and Oxford is given.

FOOD FOR THE INVALID AND THE CONVALESCENT. By Winifred Stuart Gibbs. The Macmillan Company, New York, 1912. Price 75 cents.

Miss Gibbs has prepared a short book of recipes, for which Dr. Theodore C. Janeway of New York has written a very brief introduction. The authoress is the teacher of Economic Cookery in the Teachers' College of Columbia University, and has written on this subject before. In addition to ordinary recipes there are pages devoted to special menus and diets arranged day by day so that the diet will be varied and adequate for the nutrition of the sick or well, whether they be children or adults. To those who care for the sick and have to deal with the difficult task of providing them with food which will be pleasant in taste and adequate in its nutritional properties, and who do not wish to study the subject of dietetics, the book can be commended.

THE INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment and Practitioners' Index for 1912. E. B. Treat & Company, New York, 1912.

For almost every one of the thirty years that this book has appeared we have taken pleasure in cordially indorsing it as a brief résumé of medical advance. As in previous years, the opening chapters deal with therapeutics, special attention being paid to the activity of the pituitary body, to ergot and salvarsan, to which drug very properly a large number of pages are devoted. Following these discussions abstracts from the medical literature of the last twelve months are included dealing with most of the med-

ical and surgical conditions which are met with with sufficient frequency to make them useful to the general and special reader.

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, M.D. Volume I, 1912. The J. B. Lippincott Company, Philadelphia, 1912. Price $2.00.

This issue of International Clinics contains six articles dealing with diagnosis and treatment, six others dealing with problems in medicine; three in surgery, and one each in the departments of Otology, Obstetrics, Occupational Diseases, and Eugenics. There is also an account of the College of Physicians of Philadelphia by Dr. de Schweinitz, and an editorial summary of the progress of medicine during the year 1911 by A. A. Stevens, Edward Watson, and Lucius W. Johnson.

A SYSTEM OF SURGERY. Edited by C. C. Choyce, B.Sc., M.D., F.R.C.S. Pathological Editor, J. Martin Beattie, M.A., M.D., C.M. In Three Volumes. Volume I, Illustrated. Cassell & Company, Ltd., London, New York, Toronto, and Melbourne, 1912.

This book in three volumes, the first of nearly 1000 pages, and devoted to surgical pathology and general surgery, the second concentrating upon a systematic description of the surgical diseases of the various organs and regions by authors whose special knowledge and experience entitle them to write with authority, is especially designed to serve the purposes of the practical surgeon who desires to keep himself conversant with modern teaching, and of the senior student who aims at keeping himself abreast of sound and comprehensive surgery. The list of authors includes upward of fifty names, many of them already widely known in this country, some with their spurs yet to win.

In accordance with the usual arrangement, the book opens with a section upon Surgical Bacteriology by Dreyer and Walker, excellently done, followed by the Therapeutic Applications of Surgical Bacteriology by John W. H. Eyre—an excellent study from the practical side. Inflammation is contributed by J. M. Beattie on recognized lines. Gangrene, Wounds and Wound Treatment, Military Surgery, Burns and Scalds, Constitutional Disturbance Associated with Trauma, Tumors—these are subjects all satisfactorily summarized. There is a small subsection devoted exclusively to Drowning, an innovation in a surgical text-book.

From the surgeon's standpoint there is a most satisfactory section on Examination of the Blood and the Cerebrospinal Fluid by Beattie.

The chapter devoted to Radiography leaves something to be desired. The same may be said of the contribution to Anesthesia, with the exception perhaps of the section devoted to Spinal Analgesia; this is admirable. Tuberculosis is accorded less than 10 pages and Syphilis about 60, whilst to Salvarsan are given thirteen. The latter drug and its practical applications are carefully considered. Congenital Syphilis appears in a chapter by itself. Venereal Diseases cover about 45 pages. The book closes with a brief discussion of a variety of infections: Yaws, Maduro Foot, Glanders, Leprosy, Actinomycosis, Tetanus, Hydrophobia, and Anthrax, and surgical diseases caused by animal parasites, snake bite, etc. The descriptions are as a rule excellent. Judged by the first volume this work fulfils, from the standpoint of surgical pathology at least, the intent of its authors. It shows more than a passing knowledge of current literature, and a wise selection of the best has usually been made, but it exhibits the inequalities inseparable from a multiplicity of authors. None the less it is likely to be well received by the profession as affording them a ready reference in regard to a large variety of subjects.

THE SURGICAL CLINICS OF JOHN B. MURPHY, M.D., AT MERCY HOSPITAL, CHICAGO. W. B. Saunders Company, Philadelphia, 1912.

These clinics, issued in serial form, one number every other month, admirably illustrated, this number containing about 130 octavo pages, will be cordially received by the entire profession, but with especial enthusiasm by those whose privilege it has been to hear even once one of Dr. Murphy's

inspiring talks. Until this stenographic report of Dr. Murphy's teaching appeared it seemed to those familiar with his personal magnetism that such reports would fall short of carrying the vivid interest and the drive which are essential features of his work.

The first part of the first volume opens with Carcinoma of the Breast, an admirable clinical discussion based upon a graphically described operation, embodying practically all that is rational and new upon the subject. Lipoma of the Shoulder, Varicocele, Nerve Anastomosis, Salvarsan, Cystadenoma, Pelvic Tumor, Laparotomy, Blood Clot in the Brain, Fracture of the Patella, Charcot's Disease of the Hip-joint, Nerve Anastomosis, Epithelioma of the Nose, Duodenal Ulcer—these and some other cases are vividly portrayed. It is well worth every surgeon's while to know Murphy's views upon the clinical cases as they present themselves to him.

THE SURGERY OF ORAL DISEASES AND MALFORMATIONS. Their Diagnosis and Treatment. By George Van Ingen Brown, D.D.S., M.D., C.M. Illustrated. Lea & Febiger, Philadelphia and New York, 1912.

The author states that this book is designed to be one of reference touching the medical interests of dentists, general surgeons, internists, and those whose work has been limited to rhinology, ophthalmology, otology, pediatry, dermatology, and other divisions of medical practice. He further has endeavored to produce a book sufficiently concise and well systematized to permit of accommodation to the stringent time limitations of a college curriculum, and yet impressing the salient points to the best possible advantage, and so arranged as to facilitate the work of the students in preparing themselves for examination. Moreover, the work is designed to be sufficiently comprehensive and practical to make it a useful guide in trying clinical situations after graduation. Special labor has been expended in an effort to present the subject with sufficient broadness to cover all affections directly and indirectly related. There are brief preliminary sections on Anesthesia and Hemorrhage, the latter illustrating methods of Arterial Anastomosis and Intravenous Infusion, Proctolysis and Shock.

The second chapter is devoted to Pathological Dentition; another to Infectious Diseases, including under this head Tuberculosis and Syphilis, Chancroid, Actinomycosis, Glanders and Leprosy. Thereafter follow sections upon Stomatitis and Diseases of the Nervous System affecting the Buccal Region. Among the latter are found Syringomyelia and Anterior Amyotrophic Sclerosis, affections which would not seem naturally to belong in such a book. Moreover, there is a somewhat extensive section upon Diseases of the Brain, including Neuralgia, and its Surgical Treatment by Removal of the Gasserian Ganglion. There is a very admirable description of the modern methods of fixing fractures of the jaw, a most serviceable chapter on Prosthetic Appliances used after resection, excellent sections upon the sinuses, and extremely satisfactory descriptions of harelip and cleft palate and their treatment.

The book contains much more than its title indicates and excellently summarizes the salient points of the subject treated.

DUODENAL ULCER. By B. G. A. Moynihan, M.S. (Lond.), F.R.C.S. Leeds. Second Edition, Enlarged. Illustrated. W. B. Saunders Company, Philadelphia and London, 1912.

Moynihan notes that the term "dyspepsia" as used by the older writers included every form of disorder in which the activity of the digestive processes seemed impaired. In this great group of conditions, believed to be chiefly or entirely functional, we now recognize that probably the majority of cases are due to organic diseases affecting not the stomach only but also and more frequently various organs.

Among the various forms of organic diseases, duodenal ulcer stands out the clearest. We are now familiar with its symptoms, we have learned of its dangers, we are well equipped with the means of treating it with permanently satisfactory results.

One result of this surgical discovery must be that the physician, now knowing well that which formerly was not suspected, namely, the attachment of the symptoms he

recognizes to an organic lesion, will insist upon a much stricter and a more prolonged medical treatment, and in this way it is probable that some at least of the cases which now seek help at the hands of the surgeon may be permanently relieved of their sufferings by this greater care, and escape the need of operative attentions.

The first chapter is devoted to the History of the Affection. Thereafter follow chapters devoted to Ulceration of the Duodenum in Cases of Burns or Scalds, Uremic Ulcer of the Duodenum, Tuberculous Ulceration of the Duodenum, Melena Neonatorum and Duodenal Ulcer, Differential Diagnosis, Chronic Duodenal Ulcer—Symptoms and Diagnosis, Treatment of Chronic Duodenal Ulcer, Jejunal and Gastrojejunal Ulcer, Perforation, and finally, Pathology.

There are appendices giving detailed statements of cases operated upon. The book is admirably illustrated, written in Moynihan's characteristic vivid style, and will necessarily form a part of every active surgeon's library.

THE IMMEDIATE CARE OF THE INJURED. By Albert S. Morrow, A.B., M.D. Second Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia and London.

Morrow states that this book is not intended to supplant the physician or surgeon, but is designed solely as a guide in emergencies until the arrival of medical aid, or when such aid cannot be procured. The anatomy and physiology of the body are briefly considered, the latter entirely too briefly. Thereafter there is a well-illustrated chapter upon Bandages, Slings, Medication, and Practical Remedies. General principles are dealt with, and the application of cold, heat, counter-irritants, poultices and enemata, antiseptics and disinfectants is briefly considered. Thereafter follow chapters upon Contusions and Wounds, Burns, Scalds, and Exposure to Cold, Fractures, Dislocations, Sprains and Strains, Asphyxia and the Removal of Foreign Bodies, Unconsciousness, Poisoning and its Treatment, the Transportation of the Injured, Preparation in the House for an Accident Case.

The book is an excellent one for laymen, entirely non-technical and easily understood, and giving in the main exactly the information required.

RECENT METHODS IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS. By Carl H. Browning, M.D., and Ivy McKenzie, M.A., B.Sc., M.B., Ch.B. Lea & Febiger, Philadelphia and New York 1912.

This book, written in collaboration with Cruickshank, Chislett, Gilmour, and Morton, is a record of original work, toward the completion of which numerous grants have been received from the Carnegie Trust. There is an admirable introduction summarizing the principles upon which the modern diagnostic and therapeutic methods applicable to syphilis are based.

The first part of the book is devoted to the Diagnosis of Syphilis by the Serum Reaction of Wassermann, Neisser, and Bruck; the second to the Treatment of Syphilis with Salvarsan. There is an excellent bibliography appended to each chapter, a table of fatal cases, and some general conclusions on the subject of syphilis with which the profession in general is in thorough accord. The book is written for one who wishes to be conversant with the latest thought upon syphilis and its treatment, and can be commended without reservation.

A MANUAL OF SURGICAL TREATMENT. By Sir W. Watson Cheyne, Bart., C.B., D.Sc., LL.D., F.R.C.S. F.R.S., and F. F. Burghard, M.S. (Lond.), F.R.C.S. New Edition, Entirely Revised and Largely Rewritten with the Assistance of T. P. Legg, M.S. (Lond.), F.R.C.S. In Five Volumes. Volume I: The Treatment of General Surgical Diseases. With an Appendix upon the Administration of Anesthetics by Dr. Silk, and the Examination of the Blood by Dr. W. D'Este Emery. Lea & Febiger, Philadelphia and New York, 1912.

A new edition of Cheyne and Burghard will be received with double pleasure and profit by those familiar with this book, which was originally intended, nor has the policy been changed, to give detailed information based on a thorough knowledge of modern methods as regards the after-treatment of cases.

Under Inflammation it is worthy of note that they state that drugs are of little advantage. Under Acute Inflammation Bier's treatment is considered in detail. The vac-

cines are apparently not well thought of. Gangrene is generally classed as dry and moist, nor are there any methods suggested other than those usually recognized. The practitioner is especially warned against the use of carron oil in the treatment of burns. The best dressing is regarded as cyanide gauze rinsed out in a 1-in-8000 sublimate solution, and salicylic wool.

Under Tetanus it is stated that a prophylactic administration of 10 to 20 Cc. of antitetanic serum is indicated in any case in which there is reason to suspect that the wound may be infected with the bacillus, without waiting for the typical symptoms to develop.

Under the head of Keloid fibrolysin is advised.

There is a section devoted to the Treatment of Syphilis by Salvarsan. An extensive division of the book is devoted to Deformities. There is a very excellent section on Anesthesia. The volume ends with the examination of the blood and surgical conditions.

This is a serviceable book to the general practitioner who desires to keep abreast with the best English practice of the day.

# CORRESPONDENCE.

## LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

The "strike fever" which has been menacing the country with varying gravity during the past few months has now reached a really lamentable phase. For the grave-diggers of Glasgow have struck to enforce their demands for shorter hours, more wages, and six days holiday per annum. They assert that there would be no need for them to strike if people buried their dead decently on a week-day, but as the popular Sabbath funeral deprives them of their Sunday rest, they demand extra pay for the accommodation. This recalls a strike which occurred at a hospital at St. Calais. The authorities refused to pay the usual price for the burial of those who had died in their institution, and the undertakers thereupon refused to accept their orders. The local grave-diggers started a "sympathetic strike" in their turn, and matters were only rectified after many disturbances.

We have at length happily reached the end of the coal strike at the cost of immense suffering among the poor, but the dislocation of trade and of the means of communication was not so marked as was anticipated at the beginning of the struggle. Those householders who were well stocked with coal would scarcely have known, in London at any rate, that the strike was in progress except for the extra overcrowding on the trains and omnibuses.

A highly important development has taken place in connection with the negotiations between the medical profession and the Insurance Commissioners. In view of a possible breakdown in the negotiations the British Medical Association are considering a scheme for a Public Medical Service which will be controlled by the profession itself in every insurance area. The new scheme will be outside the authority of the state, and will doubtless be offered to insured persons as an alternative, if satisfactory arrangements cannot be made with the Commissioners. It appears that in 1909, some time before the introduction of the Insurance Bill, the Association drew up the basis of the scheme now under consideration, and it is thought that this scheme, with a few alterations, will easily be made adaptable to the present situation. The rules will provide for an income limit for persons insured, and a subscriber will be able to choose his own medical attendant but cannot change him more than once a year. Subscribers will only be admitted after a medical examination and will have to pay a fixed sum per week. A subscriber will be entitled to receive from his medical

attendant, as long as his subscriptions are not in arrears, medical and surgical treatment at the doctor's dispensary, or if his condition requires it he will receive treatment at his own home, also all needful medicines and first dressings for wounds and other injuries. Special arrangements will be made for night calls, confinements, etc. It is to be presumed that the money allocated under the act for medical benefits would be handed over to the insured persons and that they would become subscribers to the Public Medical Service, but quite outside the Insurance Act.

The city of Bradford has distinguished itself by making a profit out of its sewage. The sewers of the town become filled with fat of some kind from the wool-washing which forms the staple industry of the place. Many efforts have been made to utilize the fat in London sewage and still more to save its manurial value. But the problem is still unsolved. Compressed mud from London sewage, as now treated, is valueless. It is cheaper to take it out by steamer and drop it in the North Sea than to compress it and sell it.

A bill has been introduced into the House of Commons to amend the Education (Provision of Meals) Act. Its object is to empower the education authority to continue the school meals throughout holidays and even on Sundays. Various experiments have been carried out by local authorities which show the need for the feeding of schoolchildren being continued during the holidays. One experiment carried out by Dr. Crowley showed that during the time the children were on holiday, instead of receiving benefit, they became actually physically less fit because they were not having the school meals.

Discussion is still going on as to the best site to be procured for the new home of London University. The latest suggestion is that the Royal Botanic Gardens should be used for this purpose, and as the present lessees find a difficulty in making both ends meet, the proposal may meet with favor. The gardens occupy about 18 acres, and as such an extensive area would not be needed for the university buildings a large portion of the gardens as they now exist could be reserved for the use of the students. As the gardens are situated inside Regent's Park, there would be complete immunity from noisy traffic, while the situation is central and accessible from all parts of London.

The new Shops Act which comes into force next month is causing grave apprehension to the proprietors of restaurants in the city of London. The aim of the act is to improve the conditions of those serving in shops or employed in waiting. To this end the new regulations provide that each assistant shall stop work on one day a week at 1.30, and that all shall be allowed time for luncheon before 2.30. The proprietors claim that these arrangements will cause hardships to their staffs, as their waiters who depend on their tips would have to stop work at 1.30 on one day of the week —that is, at the busiest hour of the day. Also in many city restaurants the space is so limited that it is impossible to provide a separate room for the staff, who have to lunch in the restaurant itself after the midday rush of customers is over. Under these circumstances the new act, unless amended, may entail pecuniary loss and hardship to waiters when exactly the opposite was intended by the framers of the measure.

A national memorial to Miss Florence Nightingale is to be erected in front of the Infirmary at Derby. The memory of a great woman will be honored in her native county, and it is to be hoped that London will follow the good example thus set. It has been suggested that a Nightingale College of Nursing would serve as a memorial of her creative genius, at which her teaching could be carried on for all time. The educative character of the institution would have appealed to the "Lady of the Lamp," whose mission it was to carry the laws of health into the dark places of the earth.

A dirty school child ought soon to be a *rara avis* in London. According to the report of an education officer of the London County Council personal cleanliness is re-

ceiving much attention in the Council's schools. A few years ago the Council provided spray baths at the Strand School, and here the boys are bathed every morning before lessons commence. If it were not for the great cost involved such baths would be provided in all the schools, but in Whitechapel, where such measures are greatly needed, the scholars have been bathed in slipper baths to the great benefit of all concerned. The Council next sought powers to enable its officers to examine the clothing of the scholars, and as a consequence had to make arrangements for the cleansing of the clothing, where necessary. The ratepayers now have to pay about two shillings for every child who has to be made clean and fit for school attendance.

## PARIS LETTER.

BY M. A. COURT TUCKER, M.D.

Numerous accidents have occurred in the past, and are most likely to be repeated in the future, through wide differences existing between the pharmacopœias of various nations. These differences are chiefly due to the respective capabilities of absorption of smaller or larger quantities of certain dangerous medicaments, which are at great variance in their administration, according to the medical *modus operandi* of the countries and races to which they are applied.

The evil consequences of such a state of things are obvious, and it would be advisable and prudent for individuals traveling abroad to obtain medical aid—as far as can be done—from doctors of their own nationalities, or at least from doctors who are well aware of the existence and nature of these dissimilarities. I have personally been able to trace many a serious mishap in my American and English *clientele* here to this source. For instance, in the States as well as in England calomel is very generally given in doses of one-tenth, one-fourth, or even of one or two grains; in France the doses currently prescribed vary from ten to twenty grains. Belladonna solutions are customarily executed at 4.378 against 1.40 in America; jusquiame (tinct. hyoscyamin) is dosed at 1.72 against 0.30 (Prof. Dausse's statements); nux vomica is given at 16, whilst in Germany and in England it is given at 5. Extract of opium, which is proportioned at 20 in France, in Belgium, in Austria, and in America, attains only 15 in Italy. Opium powder in the States varies from 13 to 15, while the English Pharmacopœia places it between 9.5 and 10.5.

I am showing these examples in order to illustrate the dangers to which a single patient can be exposed upon being treated by different medical men.

Another cause of error finds its root in the abbreviation "gr.," which lends itself too easily to be transformed either into "grain" or into "gramme," so that a prescription bearing j gr. of calomel can almost naturally be read 1 gramme by a French chemist.

It must be pointed out that the climatic influences which can justify these medical discrepancies are solely applicable to patients born under them, and not indiscriminately and uniformly to people coming from distant parts of the world.

In obedience to a law promulgated February 5, 1905, a compulsory declaration must be made to local authorities by all doctors attending persons affected with epidemic diseases at the earliest stage of their symptoms. The righteousness of such a law can be well conceived and understood without the help of any commentary. During the last month of August it was rumored both in Fougères and Saint Surliac—two charming summer resorts on the borders of Brittany—that two cases of cholera had been detected in these localities. The season being then at its full height, and fearing the frightening away of the fashionable visitors gathered over there by the disclosure of such unpalatable news, the practitioners of the two towns mentioned thought it advisable to keep the matter quiet, and this unwholesome hushing soon had for result a spreading of choleriform enteritis, which threatened rapidly to develop into a disastrous calamity. In spite

of energetic measures, tardily taken, many were the victims of this guilty professional cupidity. Four of the local doctors are now implicated in prosecutions directed against them upon this ground; their responsibilities are heavy, and the consequences to themselves if convicted might well mean, besides other penalties, irreparable ruin.

In the course of a divorce action, the woman plaintiff in the case accused her husband of having committed gross acts of impropriety upon a child, a nine-year-old girl, and she brought and produced in court a medical certificate to this effect. The defendant indignantly repudiated the monstrous imputation. It was elicited by the defense that the child had not been examined medically by the certifying doctor, but that the latter had simply interrogated the child and had accepted for granted her story, delivering his certificate in conformity with this strange evidence. Naturally enough, the aggrieved party started immediately a counter-action, coming out of it with flying colors. The doctor in question was convicted of having exceeded his rights in signing a defamatory and most injurious document, with the aggravating circumstance of having proceeded in a case involving a criminal prosecution without being duly permitted by a magistrate, who has the sole right to cause information of such nature to be lawfully adduced. Severe blame, heavy damages and costs were ordered before the curtain was drawn upon this unsavory affair.

Nursing has lately become so extended in its activities in France that the medical body is at present up in arms against the encroachment of the nurses, who are apparently taking day by day an active initiative toward patients and dispensing medicines to their temporary wards, thus tampering dangerously with the duties of their qualified masters. This kind of abuse has of late been so general that the proper authorities have taken stringent measures to bar the way to its continuation.

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## "ANESTHESIA BY VARIOUS METHODS."

To the Editor of the THERAPEUTIC GAZETTE.

SIR: In your editorial on "Anesthesia by Various Methods" in the March number (p. 183) you speak of Mr. Davies' method of intralaryngeal etherization, and go on to say that "Ehrenfried uses scopolamine and morphine before this method is attempted."

I have had no experience with Mr. Davies' double catheter; my experience has been entirely with the single tube introduced to near the bifurcation of the bronchi, after the method of Meltzer and Auer, and I have found it entirely satisfactory. I do not consider the double tube necessary, or even advantageous, and plugging of the larynx seems to me irksome and likely to be productive of ill effects.

I have never advised the use of scopolamine and morphine as a preliminary to any form of anesthesia, although the *Lancet*, which you refer to as your authority, makes that statement. As a matter of fact, however, I do employ morphine and atropine subcutaneously in doses not exceeding gr. ¼ and gr. 1/100, respectively, where good indications exist, such as extreme nervousness, bronchitis, and incipient delirium tremens, by whatever method the ether is to be administered. Very truly yours,

BOSTON, MASS. A. EHRENFRIED.